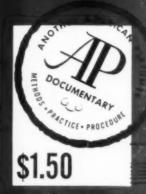
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HERUARY 1959

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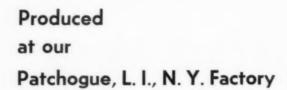
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AND AROMATICS

VOL. 73, NO. 2

FEBRUARY 1959

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Announcing...

A MAJOR CHANGE

Effective this month, the guidance and editorial reins of American Perfumer And Aromatics is being placed in the very cap-able hands of Maison G. deNavarre, as Editorial Director.

In addition, the editorial staff is being augmented to include a highly qualified managing editor to assist Mr. deNavarre in our overall expanded editorial program.

William Lambert, as Senior Edi-tor, is taking on the major as-signment of developing special long-range editorial projects we have wanted to do for some time.

I am particularly pleased to make this announcement not alone because it represents a big forward step, but also because it enables us to free Mr. Lambert for important, but, relatively, more leisurely editorial work.



James H. Moore, Jr.





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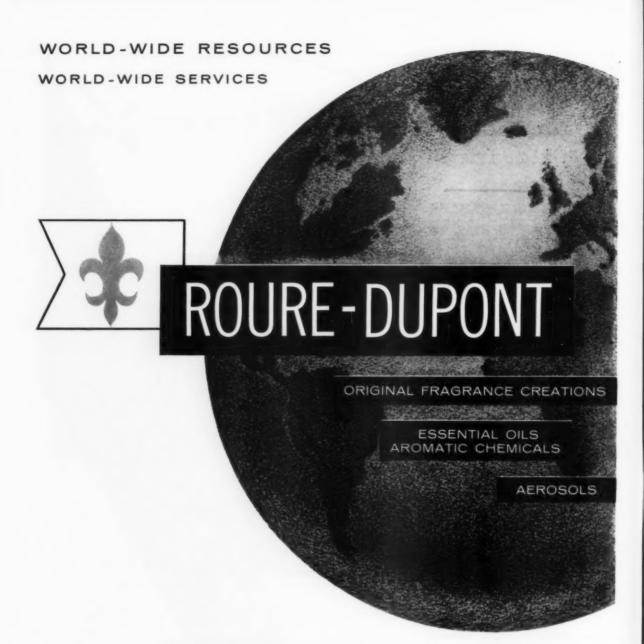
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MINUTE NEWS . . .

T. G. A. Scientific Section
Changes Schedule of Meetings

Honor for Presidents of State Pharmaceutical Assns.

Retail Druggists Hold Edge as Sales Outlets

Flavor Assn. Celebrates Golden Anniversary May 10-13

Funds to Increase Effectiveness of Cosmetic and Drug Regulation

Aspects of Food, Drug and Cosmetic Law Discussed The Winter 1959 meeting of the Scientific Section of the Toilet Goods Assn. originally announced for Monday December 7 has been changed to Tuesday December 1, 1959. To assist other groups in coordinating their technical meetings Winter and Spring, the association has adopted a policy effective December 1960 of holding the Winter meeting of the Scientific Section on the Wednesday following Thanksgiving each year. The complete schedule of Scientific Section meetings will be: May 14, 1959; December 1, 1959; May 11, 1960 and November 30, 1960; May 11, 1961 and November 29, 1961; May 9, 1962 and December 5, 1962; May 16, 1963 and December 4, 1963. All of the meetings will be held in the Waldorf Astoria hotel, New York City.

New presidents of state pharmaceutical associations will be honored by McKesson & Robbins Inc., New York City, with the presentation of a handsome plaque and removable gavel when they are installed at state conventions. While it is customary to honor retiring presidents the company felt that new presidents deserve special mention also.

The 50,000 retail druggists in the United States according to the National Wholesale Druggists Assn, survey hold the edge as sales outlets. The battle continues against strong competition posed by the rise of supermarkets, gigantic one-stop shopping centers, door-to-door salesmen and others who have been cutting into the sales of "up front" items offered by drug stores. Sales of retail druggists in 1958 were at a record high of \$6,700,000,000, a 3.7% increase over 1957.

The 50th annual convention, Golden Anniversary of the Flavoring Extract Manufacturers Assn., will be held at the Roosevelt hotel, New York City, May 10-13. The first annual meeting was held in New York City a half century ago. Dr. S. H. Baer of Blanke-Baer Extract & Preserving Co. and Robert E. Heekin of the Heekin Can Co. are the only living survivors of the original incorporators of the association. However the association is well represented by the second and third generations of the pioneers who founded it. Robert Krone is chairman of the Golden Anniversary Convention Committee which is assurance of a well planned, informative and entertaining convention.

Increased law enforcement of the food drug and cosmetic law by the Food and Drug Administration and the Federal Trade Commission are assured if the budget requests of President Eisenhower meet the approval of Congress which seems likely. A net increase of \$855,000 in the Food and Drug Administration appropriations was asked as was also an increase in the appropriation for the Federal Trade Commission of \$460,000. Secretary of Health, Education and Welfare Arthur S. Flemming is credited for securing the aid of the president in increasing the appropriations so as to make the work of both commissions more effective in manpower and in operations.

Aspects of the Food, Drug and Cosmetic law were discussed at the meeting of the New York Bar Association's Food, Drug and Cosmetic Law Section January 28. Commissioner of Food and Drugs George P. Larrick was the chief speaker at the morning session. Charles Wesley Dunn chairman of the section presided. Dr. Robert L. Swain, editor in chief of Drug Trade News and Drug Topics discussed drug law problems. On the following day attention was centered on anti-trust matters by the Anti-Trust Section which was also under the chairmanship of Charles Wesley Dunn.

April Trip to London Conference Planned for S. C. C.

F. D. & C. Yellow 1 for Lipsticks Decertified

Colgate-Palmolive Co. to Pre-Price Its Toilet Articles

Forms for 1958 Census of Manufacturers Sent Out

How to Meet New Regulations Suggested by Edward Morrish

Must Identify Food Additives Specifically Says F.D.A. Chief

T. G. A. Business Conventions Every Other Year in New York The World Travel Plan Corp. has prepared a program in connection with the British Congress of Cosmetic Science to be held at University College, London, April 15, 16 and 17 to permit members of the S. C. C. in the United States who wish to attend the congress to travel by air. A jet airplane will leave New York at 10 a.m. April 12 arriving in London at 9:35 p.m. April 13-17 will be taken up with the Congress and return flight on April 18 will leave London at 11 a.m. arriving in New York at 2:45 p.m. Arrangements can be made for any who wish to stay in Europe longer. First class and economy class passengers will be on the same plane. All accommodations and services in London will be provided. Arrangements for those who plan to take advantage of the trip and Congress should contact the World Travel Plan Corp., 150 E. 50th St., New York 22, N. Y.

The aluminum lake of F. D. & C. Yellow No. 1 which is used in the manufacture of lipsticks has been decertified by the Commissioner of Food and Drugs. This removes it from the list of D & C colors and the lake can no longer be used in the manufacture of lipsticks.

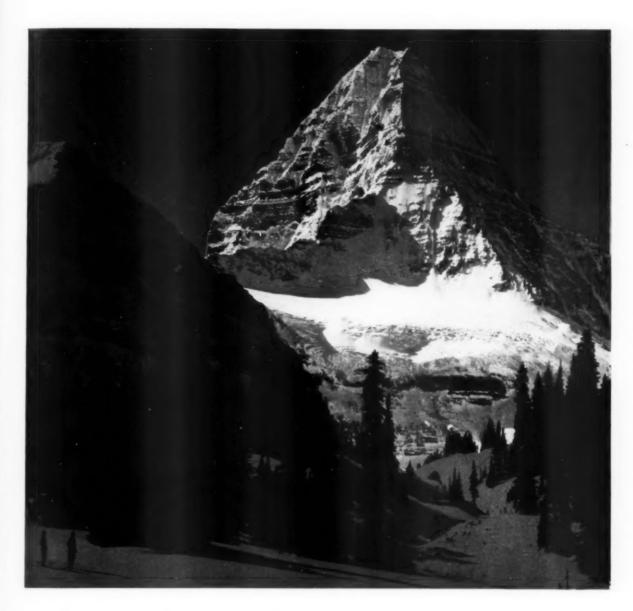
The Colgate-Palmolive Co. has proceeded with the necessary arrangements at its plants for pre-pricing of its toilet articles products. Some pre-pricing has already begun. The decision to pre-price was made by the Toilet Articles Division after exhaustive surveys throughout the country gave every indication that the greatest majority of dealers were strongly in favor of pre-pricing as a service which could save them costly time and some expense. Even though pre-pricing adds an extra operation at the plant, the company feels that it must give careful consideration to the wishes of its dealers in providing this extra service.

Manufacturers of essential oils, perfumes, cosmetics and other toilet preparations have received official forms from the Bureau of the Census, Department of Commerce, Washington 25, D. C. to be filled out by them with figures for the year 1958. By the use of improved electronic computing equipment the Bureau of the Census expects to publish precipininary figures on the census of manufacturers in the foregoing fields by the end of 1959. Answers to the questionnaires are required by law but the data is kept confidential by the government and the information cannot be disclosed for taxation or regulation. It is anticipated that all final reports of the census of manufacturers will be available before the end of 1960. Certain time limitations are indicated on the report forms within which they are to be returned completed to the Census Bureau. The forms were mailed to all establishments which had paid employes during 1958.

Edward P. Morrish, vice president, Firmenich & Co., New York City, was the speaker at the February 10 meeting of the Chicago Chapter of the Society of Cosmetic Chemists. His subject was "Original Research, a Life-line for Cosmetic Chemists Operating under the new Pending Cosmetic Regulations." Mr. Morrish discussed the relationship of the new food additive law, the new proposed color law and the two new cosmetic regulations now pending to the work of the cosmetic chemist. In view of the virtual elimination of the "unknown ingredients" of cosmetics he stressed the importance of original research by suppliers of components of cosmetics including aromatic chemicals and perfumes. The cosmetic chemist he pointed out will assume a much more significant role in the marketing of cosmetic products as there will have to be proof of safety as well as definitive proof of results. On account of the timeliness of the subject a record attendance came to the dinner meeting in Henrici's restaurant in the Merchandise Mart. Peter Parker chairman of the Chapter presided at the meeting and William Walker, program chairman, introduced the speaker.

Any scheme that would permit the use of such terms as "emulsifier" or "permitted emulsifier added" in place of the specific emulsifier in labeling food additives will not be permitted Commissioner Larrick of the Food & Drug Administration told the Food, Drug and Cosmetic Section of the New York State Bar Assn. at its meeting January 28. Any suggestion that preservatives, humectants, dessicants, etc. be designated functionally instead of specifically is out.

Conventions of the Toilet Goods Assn.—not the Scientific Section—will be held in odd numbered years in New York City and in even numbered years out of town. The 1959 convention will be held in the Waldorf-Astoria hotel May 12, 13 and 14. The 1960 convention will be held in Poland, Maine, June 27, 28 and 29.



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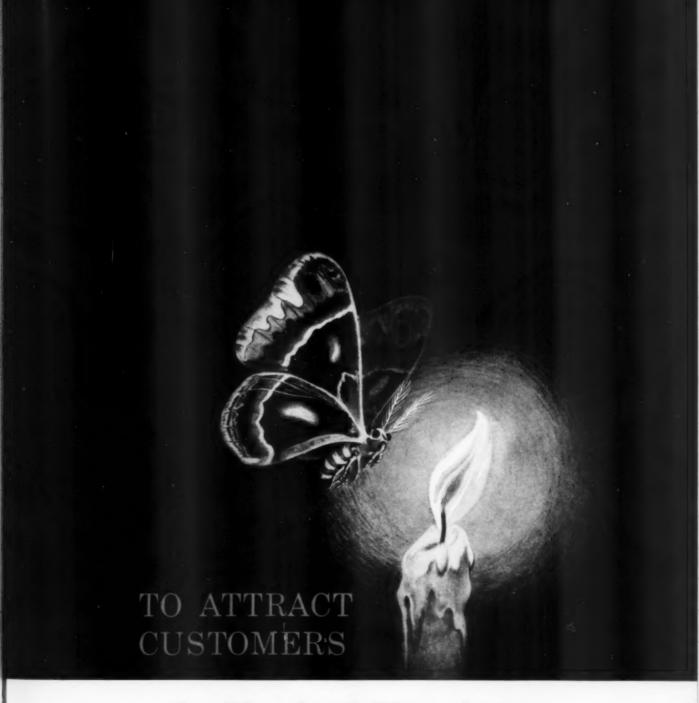
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DESIDERATA

Maison G. deNavarre, M.S., F.A.I.C.



Milano, 26th November 1958

AEROSOL SUPERMARKET

One of the most unusual promotions ever put on for members and the press was organized by the Aerosol division of the C. S. M. A. commemorating its tenth birthday. The "Press" had the chance to get in first.

Indeed, on arriving I didn't know what to expect. Wiley Pickett who greeted me, was dressed in a typical supermarket apron (plus the usual clothes). Offering to be helpful to me, I asked for a much needed glass of milk. He walked away and returned saying, "Close your eyes and open your mouth." Then I got it—a mouthful of milk chocolate sundae topping out of an aerosol. That was the best he had with milk in it.

The idea was to display some 7,000 aerosols of everything from hair spray to shoe polish and let the "press" take anything they wanted . . . FREE. (What a mistake that was). And I was from out of town with 35 pounds of baggage and flying. Met Joe Kalish; Joe lives closer to New York, and I hope he made it home with his load of aerosols. Doug Atlas showed me what I didn't need just then, the cocktail bar. Tasty hors d'oeuvres, though. I spotted some aerosol toothpaste, but by the time I got to it, it was gone.

There were a dozen different brands of everything. Counters of cans. And about 100 members of the press. Press was finished by 7:00 p.m., when dues paying members got their crack at the stuff.

I was gone long before that—but I am told that the members had Unione Technica Italiana Farmacisti

Via Bacigalupo 4

Genova

Dear Mr. deNavarre:

I have the honour and the pleasure to transmit to you the decision of our Council to name you Honorary Member of our Society. . . .

As you can see from this letter, we have changed the name of our Society "Societa Italiana di Farmacodietetica e Dermofarmacia" to "Technical Union of Italian Pharmacists." We intend to specialize not only in cosmetics and dietetics, but also in other sciences, for example, the phytopharmacie, the zoopharmacy, and so on, thus giving a greater importance to our movement.

I shall be glad to keep you informed of our progress and send you my personal congratulations.

Yours truly.

Dr. Paolo Rovesti Honorary President

practically nothing left to choose from. Oh, well! C'est la guerre.

It was quite an idea. I for one didn't know of so many things available in aerosols, and I guess they weren't all there either. It makes you wonder about the potential of this type of packaging. And like women, guess it is here for keeps.

So, to the Aerosol division of C. S. M. A., best wishes for the next ten years to be as good as the first.

COMPATIBLE QUATS

A series of three quaternary ammonium chlorides made from polyethoxylated fatty amines and methyl chloride bows in with at least one unusual property, namely, compatibility with soap solutions and polyvalent ions. They are more effective emulsifiers for systems containing electrolytes but they do not work as well with nonpolar compounds like mineral oil. Their surface tension reducing proper-

ties, antibacterial action and dispersing properties are still maintained. The three types available are made from the amines of coco. octadecyl and octadecenyl fatty acids

NOTES

A "foreign letter" in the January 3, 1959 issue of the JOURNAL OF THE AMERICAN MEDICAL AS-SOCIATION, page 134-66 calls attention to skin reaction of persons with thyroid disease on intradermal injection of thyroid solutions—this may be important particularly to our foreign readers who sometimes use thyroid extracts in their pluriglandular skin creams. . . . Haarmann and Reimer have recently mailed an interesting booklet on the compounding of a variety of fragrances using some of their perfumery specialties par-ticularly Neroflor extra. Congratulations to Dodge & Olcott on its 160th anniversary and grateful thanks for the color map showing territorial changes. May longevity and good fortune follow you in the days to come. . . . The eating of crisp apples has lowered gum disease and incidence of caries (The Practitioner, Jan., 133, 1959). . . . L. Salzmann (of L. Sonneborn

Sons, Inc.) has recently published a new, simplified test for determining shelf life of medicinal mineral oil using a spot test on a sheet of filter paper. The test has application in cosmetics and may cut testing time consderably. A nylon hair net has caused an irritating rash on the nape of the neck, the hairline of the forehead and behind the ears. Indeed, 27 cases in eighteen months were encountered in one study in which the rubber band on the hair net was found to be at fault, according to the 1958 CONSUMER December. BULLETIN. Latest F. D. A. press release refers to pollen as

SEMI-ANNUAL EDITORIAL INDEX NOW AVAILABLE

The semi-annual editorial index of AMERICAN PERFUMER AND AROMATICS for the period from July 1 through December, 1958 is now available. Copies can be obtained without charge by writing to:

AMERICAN PERFUMER AND AROMATICS 48 West 38th Street New York 18, N.Y.

"the newest phony 'wonder food.'" British Patent No. 796,319 covers a hair fixative which contains "a water soluble organic solvent, an alkali metal or amine salt of an acrylic acid ester polymer.' . . . A report on the use of protein hydrolysates in healing ointments (Arzneimittel Forchung, 8, 595, 1958) indicates that wound healing is stimulated by the hydrolysate, but was not affected by pH between 6.2 and 8.3. . . .

Book Review

SOAP, PERFUMERY, COSMETIC YEARBOOK 1958, Edited by F. V. Wells, United Trade Press, Ltd., London E.C. 4. 1958. 307 pages, 8 x 101/2 inches. Price 30 shillings (about \$4.50).

Not only is this a valuable collection of sources of supply for machinery, packaging and raw materials, but it also contains about 175 pages of articles, tables and other useful data.

A section on perfumery runs approximately 60 pages. The formulation section carries some old articles found in previous editions, but it also has some new material.

All in all, editor Wells has again come through with a useful year book. -M. G. deN.

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Mr. Carl Tylka, Director Cooper Alloy Technical Service Dept.

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1316: PARBENATE

Q. Several weeks ago we purchased the book, "International Encyclopedia of Cosmetic Material Trade Names," which has served us well. We were in search of a sunscreen, ethyl-p-dimethyl aminobenzoate, which was listed under the trade name of Parbenate, manufactured by Barnes-Hind Laboratories, Inc. We found upon correspondence with this company that they no longer make this particular sunscreen, and they did not suggest a source of supply. I have personally searched other references without success. Would you please offer a suggestion as to the source of supply of this material? I. G. C., N. C.

A. Parbenate was made only by one company, namely, Barnes-Hind Laboratories, Inc., as mentioned in your letter. As to who might be making it now, we do not know. We suggest that you write to Professor Daniels, University of Southern California, College of Pharmacy and ask him if he knows anyone who is making it,

1317: NUCLEIC ACID

Q. We have been advised that nucleic acid is an important factor in all types of cell growth and this plays some part in the growth of hair cells as well. We would like to know more about hair growth and would appreciate receiving a formula for hair growth tonic using this acid. Please send us any literature on this subject. R. Y., Conn.

A. Nucleic acid is not a single substance but a group of substances. It comes from the nuclei of live cells and obviously participates in cell growth in one way or another. There is no information, at least to our knowledge, to indicate that nucleic acid applied to skin will influence the growth of hair cells. As a result, we are not able to make any suggestions for formulation. Difco Laboratories, Inc., 920 Henry St., Detroit 1. Mich., are suppliers of nucleic acids. We suggest you write them for any data.

1318: HAIR STRAIGHTENER

Q. Please supply us with a formula for a hair straightener for the non-white trade. containing alkali, which upon applica-tion will straighten the hair in 10-15 minutes. Also please advise where we can obtain a copy of M. G. deNavarre's book, "The Chemistry and Manufacture of Cosmetics." In a past edition of your magazine, the book review section, the book "Cosmetics: Science and Technology," by Sagarin was recommended, however the publisher's complete address was not given. We would appreciate the address of the publisher at your earliest convenience. F. F. H., Texas.

A. We regret but we must decline sending you a formula for an alkali-containing hair straightening preparation for the Negro trade. These products have had a bad history of many skin irritations and quite possibly even law suits. As a result, we suggest that you look into Sagarin's book, "Cosmetics: Science and Technology," which sells for \$25 and can be obtained from the book department of the AMERI-CAN PERFUMER AND AROMATICS upon receipt of your check. There is an excellent chapter by Kolar on hair straightener in this book.

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PRESERVATIVES & ANTIOXIDANTS

PART II

ABOUT THE AUTHORS:

In acknowledgement of the cooperation of the following men, through whose efforts this American Perfumer Documentary on Preservatives and Antioxidants was made possible.

DR. LINWOOD F. TICE



Dr. Linwood F. Tice has been a professor of pharmacy in the Philadelphia College of or pharmacy in the Finaderphia College of Pharmacy and Science since 1940; and at present is associate dean and director of the School of Pharmacy of the college. He is editor of the American Journal of Phar-macy, associate editor of Remington's Pracmacy, associate editor of Remington's Practice of Pharmacy and technical editor of Pharmacy International and El Farmaceutico. Dr. Tice is a past president of the American Association of Colleges of Pharmacy and the American

macy and is a director of the American Foundation for Pharmaceutical Education and is a member of the Committee of Revision of the United States Pharmacopeia, 1940-50 and 1950-60.

DR. MARTIN BARR



Dr. Martin Barr is associate professor of pharmacy at the Philadelphia College of Pharmacy and Science a position he has held since 1952. He is also an associate in dermatology of the Graduate School of Medicine of the University of Pennsylvania. Dr. Barr is technical editor of The Apothecary and the Mid-Atlantic Apothecary and is chairman-elect of the Scientific Section of the American Pharmaceutical Association. He is also a contributing

author to Remington's Practice of Pharmacy.

FRED J. BANDELIN

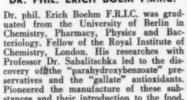
Fred J. Bandelin is a native of Cincinnati, Ohio. He received his B.S. degree from the Cincinnati College of Pharmacy in 1936 and his B.A. degree in chemistry from the University of Cincinnati in 1939. Following that he did graduate and extensive work in biochemistry, bacteriology and pharmacology at the University of Cincinnati, Antioch College and the University of Illinois. He was formerly Merrek research fellow and research chemist with the William S. Merrell Co. and the Vick Chemical Co. from 1936 to 1942. Later he was technical director of Flint Eaton & Co., Decatur, Ill., from 1946 to 1958. At present he is director of pharmaceutical research and development for Strong, Cobb & Co., Cleveland, Ohio conducting research on antibacterial and antifungus compounds, analgesics, lipotropic agents, organometallic compounds, metal chelates, therapeutic iron compounds and pharmaceutical formulations. Fred J. Bandelin is a native of Cincinnati, Ohio. He received his maceutical formulations.

EARL L. BARKLEY



Earl L. Barkley is Manager of Technical Service, (Heyden Division), Heyden Newport Chemical Corp. He is a native of Baltimore, Md. and received his B.S. degree from Franklin and Marshall College in 1943 and his M.A. degree from Johns Hopkins University in 1948 after serving as an officer in the U.S.N.R. He has been with Heyden since 1948. with Heyden since 1948.

DR. PHIL. ERICH BOEM F.R.I.C.



stances and their introduction to the food, pharmaceutical, cosmetic and other industries. Managing Director of Nipa Laboratories Ltd., England and South Wales, since 1939.

DAVID A. TRAGESER

David A. Trageser is a young man of 34 years who is engaged in technical sales work for applications of electron accelerators and engineering processes using electron radiation for the High Voltage Engineering Corporation, Burlington, Mass. He took his Noting Engineering Corporation, Burnington, Mass. He took his B.S. and M.S. degrees in chemical engineering from the Massa-chusetts Institute of Technology. He was appointed assistant professor in chemical engineering at M.I.T. and was later director of the Buffalo Field Station for Chemical Engineering Practice from 1948 to 1950. He was then with the Dewey & Almay Chemical Co., until 1957 when he engaged in his present work.

J. W. COPIUS PEEREBOOM

J. W. Copius Peereboom is one of the leading chemists engaged in research work in the laboratories of N. V. Chemische Fabrief Naarden, Busson, Holland.

BEN N. STUCKEY



Ben N. Stuckey is Supervisor, Antioxidant Group, Chemical Sales Development Lab-oratories, Eastman Chemical Products, Inc. Prior to joining Eastman Chemical Prod-Prior to joining Lastman Chemical Froquets he was employed as Food Technologist by the H. J. Heinz Co. Before that he was with the U. S. Department of Agriculture. He received his B.S. Degree in 1937 from the University of Georgia, He subsequently took his M.S. and Ph.D. Degrees at Michi-

gan State University. He holds patents on the uses of antioxidants n various products.

DR. REGINALD WILLIAMS B. Sc., F.R.I.C.



Dr. Reginald Williams is director of Nipa Laboratories Ltd., England. Graduated at the University of London with First Class Honours in Chemistry. Awarded Ph.D., degree for post graduate research in Reaction Kinetics. Fellow of the Royal Institute of Chemistry. Has collaborated closely with Dr. Erich Boehm for the past twenty years on the Nipa Ester Preservatives and Progallin Antioxidants.

DR. PRIVETT & DR. LUNDBERG

The authors of this article are associated with The Hormel Institute, a research unit of the Graduate School of the University of Minnesota. Both are members of the University faculty. Dr. Privett is head of a section that is concerned with researches in the chemistry and technology of fats and oils, and holds an appointment as associate professor on the University staff. Dr. Lundberg is the executive director of The Hormel Institute, and a professor of agricultural biochemistry.

Together, Drs. Privett and Lundberg have had more than thirty years of experience in problems connected with the autoxidation

ars of experience in problems connected with the autoxidation of fats and the prevention of oxidative rancidity.

L. R. DUGAN



L. R. Dugan was born August 18, 1915 and was reared in southern Indiana. He attended Indiana University where he took his B.S. degree and the University of Washington where he took his Ph.D. degree, specializing where he took his Ph.D. degree, specializing in organic chemistry. He has been employed by the American Meat Institute Foundation, Chicago, from 1946. In 1949 he was made chief of the division of organic chemistry. His fields of interest are oxidation of fats, stability and rancidity, antioxidants, composition of fat and utilization of fats.



SYNERGISTS

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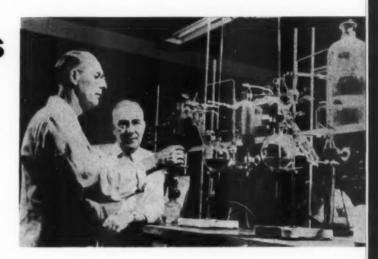
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M. G. deNAVARRE

It is worthwhile to briefly discuss four common preservatives or synergists to preservatives, alcohol, propylene glycol, glycol and formaldehyde.

Alcohol

Ethyl alcohol is one of the oldest preservatives used in pharmaceutical liquids. Some years ago Bandelin (1) published a paper on how to determine the amount of ethyl alcohol necessary to act as a preservative,

In a nutshell, the percentage of alcohol required to protect against the test organisms is first determined. Then the amount needed for the finished product is based only on that percentage of the free water content. If a polyol, such as glycerol is present, its amount is multiplied by 2 in determining the free water content.

In general from 14 to 18 per cent alcohol is considered sufficient, based on free water content.

Propylene Glycol

Trade literature (2) indicates that 15 per cent of propylene glycol is sufficient to prevent growth of A. niger and P. chrysogenum for twenty-one days.

The author has found that A. niger spores produce the following growth at different concentrations of propylene glycol in liquid Jaag medium at pH 5.6.

% Propylene

Glycol 2 4 6 8 10 12 14 16 18 Growth M M M H VH H M M ? Days 90 90 90 12 20 20 15* 365 19 months

*No change in one year.

M-moderate H-heavy VH-very heavy.

Changes in pH had little effect on these results.

However, it has also been observed that as little as 5 per cent propylene glycol in a nonionic medium preserved with 0.2 per cent methyl p-hydroxybenzoate has been effective in preventing growth of A. niger. Accordingly, in a medium free of nonionics, a synergistic effect can undoubtedly be noticed at similar concentrations or less.

Glycerol

The pharmaceutical literature reports that it takes 40 to 60 per cent glycerol to be effective as a preservative. This writer has found that in round figures, it takes about four times as much glycerol as of propylene glycol to have the same antimicrobial effect.

Most cosmetics are unable to tolerate such high concentrations of glycerol.

In limited experiments, glycerol as an auxiliary agent with 0.2 per cent methyl p-hydroxybenzoate in a nonionic medium failed to prevent growth of A. niger in a 10 per cent concentration, whereas both propylene and hexylene glycols were effective.

Formaldehyde

One of the most popular preservatives used in former times was formaldehyde. Concentrations as low as 0.05 per cent were effective in some finished products.

The undesirability of formaldehyde is manifold. It is volatile. It is highly reactive with many perfumery and cosmetic ingredients. It is irritating to skin. Its effectiveness decreases with age. It has an undesirable odor.

References

(1) Bandelin, F. J., Drug & Cosmetic Ind., 64, 430 (1949). (2) Propylene Glycol N. F., Form I. C. I., Dow Chemical Company, Midland, Mich. 1944).



Photo at left: Model AKS, 2 Mev Van de Graaff electron accelerator delivers 500 watts of ionizing radiation suitable for industrial sterilization processes. Photograph shows pressure tank enclosing high voltage terminal and acceleration column. Vacuum system is at the left.

ELECTRONIC STERILIZATION

DAVID A. TRAGESER*

David A. Trageser is a young man of 34 years who is engaged in technical sales work for applications of electron accelerators and engineering processes using electron radiation for the High Voltage Engineering Corporation, Burlington, Mass.

Research into the destruction of bacteria by ionizing radiation extends back almost to the discovery of X-rays in 1895. The work has been intensified in the last few years with the availability of radio-active isotopes and particularly with the development of high energy electron accelerators for industrial use. Accelerators such as the Van de Graafe type are already in commercial use for the sterilization of packaged surgical supplies. In addition the first linear accelerator for the sterilization of sutures was installed by Ethicon Inc. in 1958.

Electron processing is a terminal sterilization method in which a beam of electrons at energies between one and ten million electron volts is directed at a sealed package containing the material. The penetrating ability of the beam is directly proportional to its energy. The optimum thickness to use is about one-eighth inch of unit specific gravity material (water)
*High Voltage Engineering Corporation, Burlington, Mass.

per million volts.

Packages can be processed continuously on a conveyor line at high production rates. The beam is scanned uniformly over the conveyor's width. The method is most suitable for those products which can be packaged in aluminum foil or plastics rather than glass because of the loss of efficiency by the absorption of energy in the walls of glass containers. Also, the type of glass which is commercially available is discolored by radiation. A large future field of use is expected in completely continuous processes where the automatic forming of packages, filling with preparations and sterilization is carried out in an integrated operation.

The rate of sterilization depends on the irradiation dose needed and the power of the accelerator. A convenient guide is that 2,000 square inches per minute of product area can be processed per milliampere of beam current at a dose of one megacep providing the



Photo at right: Radiation Processing Vault located at High Voltage Engineering Corporation in Burlington, Massachusetts is available for experimental work or pilot runs on a rental basis. Picture shows endless conveyor belt which carries products under the 15-inch scan electron beam from the 2 Mev Van de Graaff above.

TABLE I Relative Sensitivity of Organisms

Concentration	Dose*
cells/mil	Megasep
2 x 108	0.075
1.26 x 10 ⁸	0.025
1 x 10 ⁸	0.15
	0.22
whole culture	0.4
	0.9
5 x 10 ⁵	1.2 to 1.6
5 x 10	2.1
	cells/mil 2 x 10 ⁸ 1.26 x 10 ⁸ 1 x 10 ⁸ whole culture 5 x 10 ⁵

*Lowest dose showing all negative cultures among four replicate discs

TABLE II

Effect on Pharmaceuticals at Dose of Three Megaceps

Little change in potency
Marked discoloration
Discoloration, odor of caramel

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Ergometrine maleate	Discoloration, lower melt- ing point
Morphine sulfate	No change in assay, yellow color
Atropine sulfate	Discolored, change in assay
Procaine hydrochloride	No change in assay; brown- yellow color

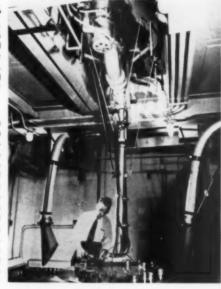
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Insulin Potency lowered Hyaluronidase Decomposed Heparin Not decomposed Vitamin B-12 Potency injection reduced Progesterone Discoloration, melting point Talc Color and Alkalinity not afRotating experimental table where petrochemical samples are irradiated at the Gulf Oil Company Research Laboratory in Harmerville, Pennsylvania. Source of radiation is powerful 3 million volt Van de Graaff accelerator.

Control room and loading area for Radiation Facility in High Voltage Engineering Corporation. In the background is the control panel for the Van de Graaff electron accelerator and the tall cabinet is an automatic dose monitor panel which gives constant record of the electron dose received and warns the operator if the dose goes below specified limits. Products to be sterilized are placed on upper conveyor belt and return on the lower belt.





beam energy is sufficient to pene-trate the thickest part of the product. Beam currents of today's accelerators range from one to five milliamperes. The rate is inversely proportional to the dose. Usually two to three megaceps is sufficient for sterilizing most drug materials.

Sensitivity of Organisms

Ionizing radiation destroys all types of micro-organisms. In general they are much more sensitive to radiation than to heat. Thus, a sterilizing dose of radiation raises the temperature of the medium only a few degrees, even when that dose is administered in a fraction of a second. This is the origin of the term "cold" sterilization.

The various types of cell life have different relative sensitivities to radiation. Insects and parasites are ten times more sensitive than bacteria spores, which are the most resistant species. Considerable differences occur even among the members of any one group.

Data on the species which are

common cosmetic contaminants are shown in Table II. These data have been tabulated from the work of Chandler and group (1). The survival curve of a strain is usually an exponential function of irradiation dose. Therefore, the number of survivors at any dose is directly related to the original population. Sterilization is an arbitrary choice of a safety factor which depends on the degree of "Kill" desired, and on the original level of contamination.



Same as B. Also shows mirror system for supervised radiation in High Voltage Facility.

Chemical Changes

Irradiation may produce other effects because chemical bonds are broken and reformed. While total chemical changes in irradiation sterilized drugs or cosmetics are well below one per cent under the most favorable conditions, changes in color, odor or activity may be noticeable. Little has been published on the irradiation response of cosmetics. Horne (2) has summarized the effects on pharmaceuticals, as shown in Table II. Chemical compounds, like organisms, differ widely in their response. Each commercial preparation should be tried and evaluated. Environmental factors during irradiation, such as temperature and presence or absence of oxygen, can also influence the response.

References

- Chandler, V. L. Relative Resistance of Micro-organisms to Cathode Rays, Applied Microbi-elogy, 4, May 1956. I. Nenspering Bacterie. II. Yeast and Molds. III. Bacterial Spores. Horne, T. The Irradiation of Pharmaceutical Products, Paper No. 276, Second United Nations International Conference on the Peacetime Uses of Atomic Energy, Geneva, 1958.

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ANTIOXIDANTS in the MANUFACTURE of COSMETICS

J. W. COPIUS PEEREBOOM*

J. W. Copius Peereboom is one of the leading chemists engaged in research work in the laboratories of N. V. Chemische Fabriek Naarden, Bussom, Holland.

The very extensive literature on the subject of antioxidants includes references to a large number of primary antioxidants, usually of a phenolic nature. Among these, the gallates, the use of which is permitted in almost all countries to-day, occupy an important place. Gallic acid is widely distributed in nature as a constituent of the tannins which are present in foods, especially in tea. In several papers the gallates are stated to be non-toxic²⁻³.

Just before the war, Sabalitscha and Boehm took out patents for the lower gallates*, Tollenaar taking out a patent for the use and preparation of higher gallates in 1949⁵⁻⁶.

*Research Department CHEMICAL WORKS "Naarden."

Owing to their markedly lipophil character, these higher gallates, chiefly octyl- and dodecyl-gallate, are more readily fatsoluble than, e.g., propyl gallate. As they are considerably less soluble in water, there is much less risk of troublesome discolourations by traces of iron. Moreover, the high partition coefficient over O/W systems renders dodecyl gallate much more effective in all hydrous systems. The so-called carry-through property of dodecyl gallate is of vital importance in the baking industry and is of some cosmetic importance too. Table I lists a number of important physical properties of the most widely used gallates.

In recent years, octyl and dodecyl gallate have come to be extensively used in the stabilization of animal and

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TABLE I

Some physical properties of the gallates. Solubility in vol.% : gr/100 ml and weight % = gr/ total weight.

	melting point	solubility in water 20°C	solubility in arachis oil 20°C	distribution coëfficient oil/water
gallic acid	220°	1,1 vol %	<0.01 vol %	1/8 20°C.
ethyl gallate	152-153°C	0,26 "	0,01 "	0,33
propylgallate	148-149°C	0.2	< 0.05 "	1,2
octylgallate	94-95°C	0.0036 "	0,3 "	150
dodecylgallate	96-97°C	<0,001 "	0,4 "	8

The solubility of the gallates in:

	propyleen glycol at	mineral oil:20°C	ethanol	castor oil 20°C	lard. 65°C	hydrogen	glycerin	tallow
	20°C					65°C	20°C	65°C
ethylgallate	30 w %	- Charles	_		-	_	20 vol %	_
propylgallate	30 "	0,5 vol %	-	22 vol %	_		40 "	_
octylgallate	15 "	0,005 "	44 vol %	18 "	11,5 w %	17w%	20 "	14,5w%
dodecylgallate	4 "	0,01 "	50 "	21 "	14	"17 "	< 1 "	15 w%
Ethylgallate	lanolin 6	65°C						
P. G	6 vol							

vegetable fats, milk, whole-milk powder, soups, roasted peanuts, margarine, cod-liver oil, vitamin A concentrates, cattle foods, baked goods, cosmetics, etc. Attention will be confined to a number of uses of importance to the cosmetic chemist.

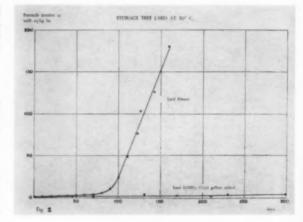
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Stabilization of animal fats.

D. G.

The stability of animal fats is greatly enhanced by the addition of octyl gallate. For instance, the keeping quality of lard is increased from 2 to 11 and 26 months respectively, by the addition of 0.005 per cent and 0.01 per cent octyl gallate. (Figure I)

A synergistic mixture of octyl or dodecyl gallate, BHA, BHT and a simple synergist such as citric acid, was prepared by "Naarden". This mixture, containing octyl gallate, was called Antrancine 20, another compound, containing dodecyl gallate, being called Antrancine 22.



Advantages of synergistic mixtures.

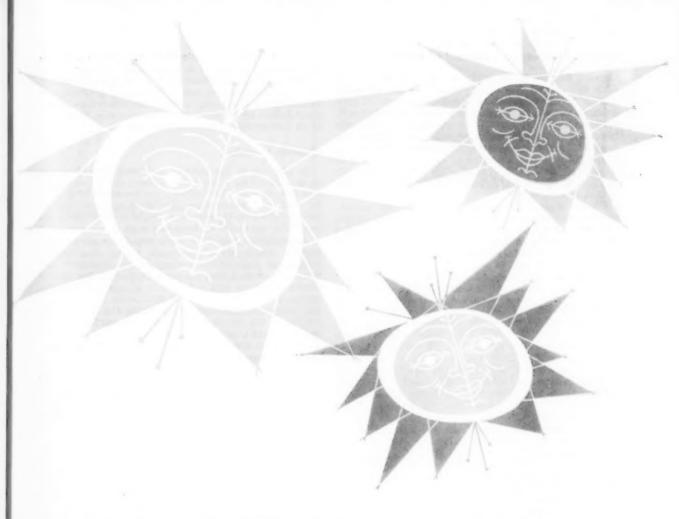
This Antrancine 20 mixture offers the great advantage that the total quantity of antioxidant added may be considerably reduced as a result of the synergistic action. Currently, 0.01 per cent Antrancine 20 may be substituted for the 0.01 per cent gallates, which considerably reduces the amount of foreign matter added. Even in the most adverse conditions, discolorations by

Fe are no longer possible; in addition, the scope is superior to that of all suitable individual antioxidants.

So far, animal fats have been avoided in cosmetic formulations, but it may be that the use of antioxidant mixtures will facilitate the use of these fats in the near future. Their use is undoubtedly justified by their reported beneficial effect on the skin (turtle oil, mink oil).

Table II Swift values of various samples of lard

Control + 0.005% octyl gallate	Unrefined lard 1 hr. 12 min. 12 hrs. 30 min.	medium-grade 0 hr. 42 min. 8 hrs. 30 min.	high grade 1 hr.
+ 0.02% octyl gallate			13 hrs. 50 min.
+0.02% BHT			12 hrs. 55 min.
+ 0.02% Tenox II			9 hrs. 30 min.
+0.02% Stabolec	13 hrs.	14 hrs. 30 min.	
+0.02% Antrancine 20	18 hrs. 30 min.	20 hrs. 30 min.	15 hrs. 15 min.



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Difference between vegetable and animal fats.

The difference in behaviour to stabilization of vegetable and animal fats is attributable to the following causes. Animal fats contain practically no natural antioxidants and are usually packed in such a way that sufficient oxygen is present. The stability is markedly increased by the addition of phenolic antioxidants, the mere addition of synergists not being very effective.

The behaviour of a number of vegetable oils such as coconut oil as well as several hydrogenated vegetable and animal oils e.g. hydrogenated fish oils is comparable to that of animal fats.

On the other hand, most vegetable oils still contain some natural antioxidants after refining. The glycerides of these oils mainly consist of the highly unsaturated and very oxidizable fatty acids: linoleic and linolenic acid, while on the other hand a large proportion of the more stable oleic acid is present in animal fats.

Sealed and adequately filled bottles are usually used as containers, so that only a small quantity of oxygen is present. Under these conditions, very low peroxide values will suffice to produce off-flavours. This "flavour reversion" occurs before the oil shows true signs of rancidity. Many actual storage tests made at room temperature are only concerned with the behaviour of the oil during this flavour reversion.

The mere addition of primary synthetic antioxidants such as gallates, and of so-called natural antioxidants such as alpha tocopherol produces under these circumstances only a slight improvement in the organoleptic quality of the oil.

Unlike the effect on animal oils, the addition of synergists alone has a relatively marked effect in this case.

The most satisfactory results may be obtained by the addition of a synergistic mixture of antioxidants and synergists like Antrancine 22, which has a favourable effect on e.g. peanut oil (Tollenaar)⁸.

Finally, animal fats are characterized by a virtually linear relationship between the stability value in an AOM stability test and that in an actual storage test. Vegetable oils do not display such a marked relationship of this type¹⁰. The interdependence varies with the type of oil.

Castor oil is still being widely used in the manufacture of lipsticks. Though this oil shows a fair degree of stability in normal conditions, signs of rancidity may rapidly appear on exposure to sunlight in the presence of bromo-acids and other additives. By adding 0.2 per cent antrancine 22, the Swift value (in relation to PV=20) is increased from 26 to 220 hours (Table V and figure 3).

Table V. AOM stability test of castor oil.

Swift value in relation to PV = 20

 $\begin{array}{c} PV = 20 \\ \text{Control} \\ + 0.2\% \text{ Antrancine } 22 \\ \end{array}$

Stabilization of emulsions.

Autoxidation also occurs in lipoids in the form of emulsions. In this case, there will be a polyphasic system of fat, water and some other constituents such as proteins, amino-acids, vitamins, detergents, ascorbic acid, etc. The capacity of antioxidants to stabilize these polyphasic systems has not been much studied in the past, despite the practical value of these systems, especially in the cosmetics industry^{9, 18, 19}.

We can assume an antioxidant to be more active in such systems the less it is extractable by water.

The partition coefficient of a particular antioxidant over the fat-water system is therefore an important factor in the stabilizing action. The advantage of dodecyl gallate which has a very high partition coefficient, is an outstanding feature in this case.

Cosmetic formulae.

In addition to the general requirements which have to be fulfilled by a good antioxidant, the latter should also comply with the following requirements if it is to be used in cosmetic formulae: it should not have an irritant effect on the skin and should be effective in the particular fat-water systems met with in cosmetics.

Autoxidation may be a fairly rapid process in these systems which are also present in e.g. mayonnaise, margarine and edible creams. Both Spetsig¹⁷ and Sand-ell¹⁸ showed that the autoxidation of dry methyl linoleate and dry lard respectively is accelerated by the presence of a water phase. Autoxidation of the fats is due to the oxygen present in the water and starts at the surface of the fat phase. Moreover, the surface area of this fat phase is very large in finely dispersed emulsions. This surface area is 600-1,000 m.² per 1. in margarine, the drop diameter being 2-3µ²⁰.

The oxygen content of the water is determined by the rate of diffusion of O₂ in water and the amount of air incorporated into the emulsion when the latter is prepared. In addition, the water phase may contain a fair number of metal ions in some cases, which further accelerates the process of autoxidation.

Laboratory tests.

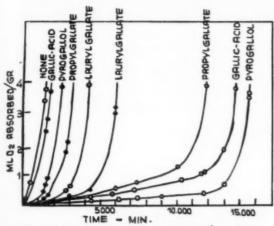
It is very difficult to make comparative laboratory tests in the case of these emulsion systems. Moreover, the results obtained are not always entirely representative and comparable with actual storage tests. The following methods of testing have been described in the literature.

- The oxygen absorption of a stable emulsion is studied manometrically, using Warburg's apparatus^{17,19}
- (2) Swift test of a coarse oil-in-water emulsion at, for instance, 45° C.²⁰. Harry describes a type of Swift tube in which the emulsion is preserved by a stirrer²¹.
- (3) Accelerated autoxidation test of a fat and water phase which are in the closest possible contact with one another²². One of the methods of determining autoxidation in this case is by using the discoloration of 0.01 per cent carotene as an indicator²³.

Antioxidants in fat-water emulsions.

These methods are very useful in fundamental research into the nature of autoxidation in these fat-water systems. They have already revealed several facts. A comparative study of pyrogallol derivatives as antioxidants for dry methyl linoleate and methyl linoleate in contact with an aqueous phase having a pH of 5.1 at 58° C., showed that the presence of water decreases the effectiveness of water-soluble antioxidants, but increases that of fat soluble antioxidants such as NDGA, a tocopherol and dodecyl gallate. (Spetsig²⁴, method 1) (cf. Fig. 2).

Lehmann and Watts⁴⁰, who used method 3, reported the antioxidant properties of BHA in lard in the presence of an aqueous phase (pH = 7.5) as being superior to those of tocopherol, NDGA and the gallates. Although



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the general conclusions remain the same, this shows the effect of the method used.

The pH level of the aqueous phase has a marked effect on the process of autoxidation. When the pH of the aqueous phase is increased from 5.1 to 9.2, even the antioxidant properties of the fat soluble antioxidants will be gradually reduced (Spetsig, 41). An oxidation test made by Sandell and Spross¹⁵ using method 3, also showed that even fat soluble antioxidants no longer have a stabilizing effect in the presence of an alkaline aqueous phase (Table VI).

Accordingly, there is no sense in using these antioxidants to stabilizing cosmetic formulae characterized by the presence of an alkaline aqueous phase. In the presence of an aqueous phase ranging from acid to neutral, it is advisable to use primary antioxidants having a very high partition coefficient over the oil-water system, e.g., dodecyl gallate, either alone or in mixtures.

Metals, especially copper, have a marked pro-oxidizing action in very finely dispersed emulsions. Owing to the large surface area of the fat phase, even very slight concentrations of Cu^{**}ions in the aqueous phase of 0.5-2.5 y per 10 ml. may have a marked effect.

When non-distilled water and a copper apparatus is used, this aqueous phase may often contain 0.1-1 γ of Cu per 10 ml. In addition, samples of lanolin occasionally contain as much as 10-100 γ of Cu per 10 gr.²⁷. Under these conditions, metal scavengers such as EDTA have a particularly marked effect on autoxidation.

Orthophosphates are frequently used as metal-inactivating synergists in dry fat. The polyphosphates and especially hexametaphosphate have a very marked synergistic action in the presence of an aqueous phase, whereas the ordinary water-soluble phosphates are not very effective in this case^{28, 25, 29}.

Ascorbic acid, too, is often used as a synergist in dry fat. In contact with an aqueous phase and when primary antioxidants are absent, however, ascorbic acid has a pro-oxidizing effect²⁸. Spetsig claims that even in this case the fat soluble antioxidant ascorbyl palmitate has a marked synergistic action at a pH level of 5.1³⁰.

When e.g. skin-foods contain tissue extracts, haemoglobin or both, the addition of ascorbic acid will increase the velocity of the oxidation to a rate beyond that caused by the haemoglobin alone. Propyl gallate, a tocopherol and nitrogenous compounds are of little use in these conditions. In this case, synergistic mixtures of fat soluble antioxidants such as BHA, BHT and NDGA will be more effective¹⁹.

Citric acid especially is widely used as a synergist (metal-scavenger) for dry fats. This synergistic effect is entirely absent, however, in a water-in-oil emulsion (cf. Table VI).

Table VI

Accelerated oxidation test in a lard-in-water emulsion (20 per cent water). Protection factors: value stabilized fat divided by non-stabilized fat values, according to the Sandell-Spross method¹⁸.

lard + 2 per cent mono-olein emul- sion with water	idem + 0.01 per cent citric acid	lard + 2 per cent mono-olein emul- sion and 15 per cent borax solu- tion
+ 0.003 per cent		
hydroquinone 1.0 +-0.003 per cent	1.1	-0.3
NDGA 1.7	1.7	0
+ 0.003 per cent		
PG 3.7	3.7	-0.2

On the whole, water-soluble synergists (metal-scavengers) are not satisfactory in the presence of an aqueous phase ranging from weakly acid to neutral.

In that case, more fat soluble synergists such as hexametaphosphate, mono-isopropyl- and stearyl-citrate, ascorbyl palmitate and palmitoyl phosphate will be more effective than are the free acids⁵⁰. Fat soluble synergists should be substituted for the water-soluble synergists present in synergistic antioxidant mixtures for use in cosmetic emulsions.

Special subjects.

Three subjects relating to the use of antioxidants in cosmetics have been the focal point of our special interest for some time past.

(1) Stabilization of lipsticks.

Castor oil is still being widely used in the manufacture of lipsticks.

Castor oil imparts the advantageous thixotropic effect to lipsticks³². A drawback consists in the fact that castor oil may rapidly turn rancid in the presence of bromoacids and lakes, especially on exposure to strong sunlight. In view of the prolonged period of storage during which the lipstick should retain its good quality, including its

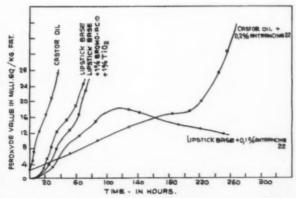


FIG. 3. R.O.M. STRBILITY TEST OF THE STRBILISATION OF CASTOR OIL CONTRINING LIPSTICK BASE WITH ANTRANCINE 22.

Synfleur perfumes are backed by more than a half-century of successful research, development and manufacture. Established in 1889, Synfleur has pioneered a large number of quality flavors and fragrances and constantly keeps abreast of new trends and discoveries to supply industrial needs. This extensive effort has resulted in a comprehensive line of perfumes especially developed for use with aerosol propellants — fragrances that rank high on consumers' preference lists. That's why Synfleur perfumes will help sell your aerosol products and keep them sold! They're yours for bigger profits.

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SACHET SPRAYS	- 18
Lavender	DH-66
Cologne	DH-111
Cologne Bouquet	DH-117
Carnation	DH-131
Cedar Wood	DH-132
COLOGNES — PERFUMES	
Cologne	DH-23
Bouquet	DH-28
Floral	DH-57
Lavender	DH-66
Liloc	DH-72
Floral Cologne	DH-83
French Oriental	DH-87
French Bouquet	DH-90
Cologne	DH-111
Jasmin Bouquet	DH-123
Mist Bouquet	DH-125
Mist Bouquet	DH-130
English Lavender	DH-133
Oriental Bouquet	DH-138
Sandalwood	DH-149

Junaarwood	Dilitar
HOUSEHOLD & AIR FRESHE	NER SPRAYS
Cologne	DH-23
Siberian Pine	DH-29
Pine Wick Type	DH-30
Xmas Tree Pine	DH-31
Meadowsweet Bouquet	DH-34
Bouquet	DH-41
Lavender Bouquet	DH-45
Rose	DH-55
Orange Blossom	DH-59
New Mown Hay	DH-69
Spice	DH-74
Pine Virgin	DH-112
Cool Mint	DH-1,15
Spice Lavender Bouquet	DH-129
Carnation	DH-131
Medicinal	DH-139
Cool Pine	DH-144
Lavender Bouquet	DH-150
HAIR LACQUER PVP	
Cologne	DH-23

	raveuges pondnes		DH-130	
R	LACQUER PVP			
	Cologne	F	DH-23	
	Rose	D	DH-55	
	Orange Blossom	R	DH-59	
	Floral Bouquet		DH-79	
	Friench Oriental		DH-87	
	Oriental	į.	DH-103	
	Cologne Bouquet	1	DH-117	
	Carnation		DH-131	

SHAVE CREAMS, SHAMPOO	S. SOAPS
Spice	DH-40
Lavender Bouquet	DH-44
Oriental Bouquet	DH-54
Rose	DH-55
Spicy Flora! Bouquet	DH-56
Lilac	DH-72
Bay Rum	DH-89
Lemon	DH-94
Carnation	DH-131
English Lavender	DH-133
Lavender Bouquet	DH-150

PHARMACEUTICALS				
Spice	DH-40			
Medicinal	DH-70			
Bay Rum	DH-89			
Lemon	DH-94			
Lilac Bouquet	DH-95			
Jasmin Bouquet	DH-123			
Floral Bouquet	DH-147			

Cologne	DH-23
Spice	DH-40
Lavender Bouquet	DH-44
Oriental Bouquet	DH-54
Rose	DH-55
Orange Blossom	DH-59
Lavender	DH-66
Floral Bouquet	DH-76
Lemon	DH-94
Lily Muguet	DH-102
Lavender	DH-119
Carnation	DH-131
Cologne	DH-142
Floral Bouquet	DH-147

MOTH & INSECT SPRAYS	
Siberian Pine	DH-29
Cedar Balsam Pine	DH-33
Violet	DH-42
Spicy Mint	DH-50
New Mown Hay	DH-69
Spice	DH-74
Para Odor	DH-122
Jasmin Bouquet	DH-123
Cedar	DH-127
Cedar Wood	DH-132
English Lavender	DH-133
Lavender Bouquet	DH-150

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storage as merchandise as well as the period during which it is subsequently used by customers, this rancidity is regarded as a serious problem by manufacturers. When lipsticks turn rancid, this will result in off-favours, the lipsticks will become distasteful, the perfume present is destroyed and, finally, the lower aldehydes and ketones formed during the autoxidation will have an extremely irritant effect on the skin. Our investigations have shown that the stability of castor oil in a Swift test is increased from 26 to 220 hours when 0,2 per cent Antrancine 22 is added.

In view of this finding, the reactions of a lipstick base containing castor oil were studied in an AOM stability test. (Fig. 3). The untreated lipstick base attained a peroxide value of 20 after 62 hours, which was followed by a rapid increase of the peroxide number. The addition of 0.1 per cent Antrancine 22 to the base, however, completely alters the autoxidation curve. Decomposition of the hydroperoxides results in a decrease of the peroxide number as soon as a peroxide number of 18 has been attained. Accordingly, a peroxide value of 20 is not reached at all in this case.

Contrary to expectations, autoxidation of the lipstick base is also slightly retarded by the addition of 1 per cent erythrosin and 1 per cent TiO2.

The same lipstick base which had an initial peroxide value of 0 was stored in a dark place at room temperature for 6 months. The peroxide number increased to 18-20 during this period, organoleptic testing revealing an unpleasant bitter taste.

Another lipstick formula ³³ was tested with a view to studying the effect of ultraviolet rays on the production of peroxides. Both the lipstick base itself and the lipsticks manufactured from this base were stabilized using 0.2 per cent Antrancine 22. A thin layer of the various samples was poured into a number of Petri dishes and then exposed to ultraviolet rays. When the lipstick base is stabilized with Antrancine, peroxide production is initially accelerated,—it being retarded at a later stage. The lipstick itself always displays a markedly retarded peroxide production (cf. Table VII.)

Table VII.

Keithler's (58) lipstick base (1), containing 35 per cent castor oil.

Peroxide values after x hours of exposure to ultraviolet rays.

	0 hrs.	12 hrs.	19 hrs.	25 hrs.	33 hrs
untreated base	0	42	30	35	-
base + 0.2 per cent antracine 22	0	52	57	25	_
lipstick	0	31	30	33	58
lipstick + 0.2 per cent antracine 22	0	17	10	19	49

The results obtained in these tests suggest that stability of lipsticks containing a large proportion of castor oil may be improved by antioxidant mixtures.

In this case again, the actual effect of the antioxidants will have to be determined by actual storage tests.

Autoxidation will be noticeably affected by the presence of particular constituents of the formula, such as detergents, preservatives, sunburn filters, lanolin derivatives, etc. Therefore it may be that different effects will be obtained using various formulae for the same sort of product in these studies. Furthermore, it is likely that the reaction mechanism of autoxidation will not be entirely identical in the dark and on exposure to ultraviolet rays. The fact that a particular antioxidant markedly

retards autoxidation in the dark, does not imply that peroxide production is inhibited to a similar extent on exposure to ultraviolet rays.

(2) Stabilization of lanolin.

Wool-fat sterols are liable to fairly rapid oxidation in the presence of oxygen. In principle, this autoxidation process is entirely identical to that of unsaturated fatty acids, the first intermediate product being hydroperoxides, identified by Janecke (35) by paper chromatography.

These hydroperoxides subsequently yield secondary products of oxidation. A similar autoxidation process occurs in the lanolin itself. Immediately after manufacture, the peroxide value of the pure lanolin is approximately 0. After having been stored from 6 to 12 months, these batches show peroxide values ranging from 50 to 150 (36).

Peroxide production starts at the surface exposed to the air and subsequently extends to the layers not in direct contact with oxygen. This autoxidation process, like that of unsaturated fatty acids, is accelerated by metals which are frequently present in high concentrations (up to 0.70 mgr. per 100 gr.) in commercial products.

In an advanced stage of oxidation, the colour of pure and initially nearly colourless lanolin ultimately changes to a yellowish hue, and a characteristic off-flavour results.

This oxidation process is associated with an appreciable increase in water-soluble oxidizable products, accompanied by a rise in the acid level of the oil phase. The sterol content diminishes, while polymerization increases the viscosity of oxidized lanolin (36).

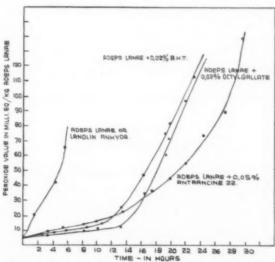


FIG. 4. R.O.M. STABILITY TEST OF ADEPS LANGE OR LANGLIN ANHYDR.

This alters the emulsifying properties of lanolin. Wool fat and wool alcohols in water-in-oil emulsions are known to "crack" on storage. This diminished emulsifying action is attributed to these effects, especially to the loss of solubility of the oxidized material in the hydrocarbon or lipoid phase of the emulsion (Muirhead, 39). In this case, the stable equilibrium resulting on preparation of the emulsion has been deranged.

These effects are retarded by the inclusion of an effective antioxidant in actual storage tests (39). Per-

sonal experience has shown that the hydroperoxides of lanolin and wool fat alcohols, like those of unsaturated fatty acids, may be broken down by heating the lanolin for a few hours at 150° C., preferably in a vacuo. The peroxide value will then rapidly fall to 0-5. Provided the hydroperoxides have been previously destroyed by this method, even batches of lanolin in an advanced stage of oxidation may be stabilized by antioxidant (mixtures) The wool fat acids contain only a small proportion of double bonds and are hardly liable to autoxidation (36). The autoxidation process of lanolin, like that of lipids may be accelerated in a "Schaal-oven test", or AOM stability test at high temperatures. Janecke (37) states that the autoxidation of lanolin and of wool fat alcohols is markedly retarded by various phenolic antioxidants. So far, however, no exact Swift values relating to this autoxidation process have been reported in the literature. We obtained the following results in AOM stability tests on lanolin (Table VIII and Figure 4).

Table VIII.

AOM stability test anhydrous lanolin or adeps lanae (peroxide value = 5.0).

AOM hours

control	peroxide value at 20 mEq/kgr. 1 hr. 35 min.	peroxide value at 50 mEq/kgr. 5 hrs.		
+ 0.02 per c. BHT	12 hrs. 25 min.	16 hrs. 50 min.		
+ 0.02 p. c. octyl gallate	14 hrs. 35 min.	18 hrs.		
+ 0.05 p. c. An- trancine 22	12 hrs. 25 min.	21 hrs.		

The incubation period, like that in other animal fats, is considerably prolonged by the addition of BHT or octyl gallate. When the value 20 has been attained, the peroxide level rises rapidly. The addition of 0.02 per cent octyl gallate increases the Swift value (to a peroxide value of 20) from 1 hr. 35 min. to 14 hrs. 35 min. Autoxidation, too, is markedly retarded by 0.05 per cent Antrancine 22. This curve, however, shows a more gradual increase of the peroxide numbers in this case -a feature also observed in vegetable oils.

(3) The effect of volatile oils on stabilization.

Finally, attention should be drawn to the effect of various essential oils on the stability of oils and fats. Terpenes and terpine-like compounds, large quantities of which are found in bergamot and other citrus oils,

etc., are liable to very rapid autoxidation. When a quantity of excessively oxidized essential oil is added to an edible oil, this will considerably accelerate the autoxidation. In order clearly to illustrate this effect, Ruys made the following AOM stability tests (cf. Fig. 6). When 2 per cent of old lemonoil (having a peroxide number of over 100) is added to a peanut oil having a Swift value of 4 hrs. 30 min., the Swift value will decrease to about 1 hr. 30 min. By adding 0.03 per cent antrancine 20, the Swift value of the untreated oil is increased by the value S 1. The Swift value of the peanut oil is also increased by an approximately equal amount (S 2) by stabilization in the presence of 2 per cent of fresh lemon oil. However when 2 per cent of the old lemon oil is added to the same peanut oil, the addition of antioxidants will have merely a slight effect. (S3)

It may be concluded that a large number of cosmetics, both liquid cosmetics having a vegetable oil base and emulsions containing a large proportion of lipoids, should be stabilized by the addition of antioxidants.

However, the above data show that there is little sense in stabilizing emulsions with an alkalineaqueous phase. Possibly, soap antioxidants such as otolylbiguanide may be used in this case.

In selecting effective antioxidants, a synergistic mixture of highly fat soluble antioxidants, e.g., dodecyl gallate, BHA, BHT, NDGA, etc., is to be preferred (e.g., Antrancine 22 or modified Antrancine 22 mixtures specially suited for cosmetics). Polyphosphates, fatsoluble esters of citric acid or ascorbic acid and EDTA may be used as synergists.

The question as to whether this antioxidant mixture will yield favorourable results in actual practise, however, should always be decided by actual storage tests. The conflicting effects of all foreign constituents such as detergents, preservatives, sunburn filters, insect repellents, etc. can only be taken into account in these tests.

In conclusion, the author's grateful acknowledgments are due to the board of directors of the Chemical Works "Naarden" Ltd., for their permission to study and publish the data reported in this article.

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PRESERVATION with ANTIOXIDANTS

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BEN N. STUCKEY*

The art of preservation, particularly in foods and cosmetics, goes well beyond the recorded history of man. When the cave man half cooked his meat, he not only heat-sterilized it against bacterial spoilage but added natural antioxidants in addition to enhancing its odor and flavor. One of the earliest observations of the effect of an antioxidant was made by Chevreul (2), who reported that a film of linseed oil required more time to dry on an oak plank than on poplar or pine. This effect was later attributed to the antioxidant activity of the tannins in the oak.

The first true experiment to find an antioxidant was probably initiated by Moureu and Dufraisse (3,4) during World War I. Their object was to stabilize acrolein against polymerization and discoloration (oxidation). After testing a multitude of compounds they found that minute quantities of hydroquinone or pyrogallol would inhibit breakdown and permit large scale production of acrolein for the war effort. This success spurred these researchers to greater effort resulting in the evaluation of over 500 compounds and the laying of the groundwork for most of the later antioxidant research. The rubber and petroleum industries were the leaders in subsequent antioxidant studies and soon evolved potent systems for inhibiting oxidative degradation in their products.

The food and cosmetic fields were limited to the use of naturally occurring antioxidants such as the tocopherols and phenols because of the toxicity of the known compounds. No real progress was made in these fields until the introduction of the gallates with proof of their low order of toxicity. These compounds,

with propyl gallate as the main one, were followed closely by BHA (butylated hydroxyanisole) and later by BHT (butylated hydroxytoluene).

Although the above three phenols are the most widely used antioxidants in the food and cosmetic fields, others have been approved and are used to a lesser degree. The following antioxidants are now recognized as safe additives for foods and cosmetics in the U.S.A.

BHA
BHT
Dilauryl Thiodipropionate
Distearyl Thiodipropionate
Lecithin
NDGA (Nordihydroguaiaretic Acid)
Propyl Gallate
Resin Quaiac
Thiodipropionic Acid
Tocopherols

The three major antioxidants, BHA, BHT and propyl gallate are quite similar in structure and physical properties. However, they react quite differently in many respects. In general, BHA, which is marketed as a mixture of the 2 and 3 isomers, is extremely potent in low concentrations, quite heat stable, and very effective in fats of animal origin. BHT is potent at normal antioxidant concentrations, possesses good heat stability, and is very effective in fats of mineral origin. Propyl gallate is extremely potent in low concentrations, heat liable in an alkaline medium and very effective in fats of vegetable origin. Its metal salts are blue-black in color; so caution must be used where this discoloration is detrimental. A summary of the properties of these three major antioxidants follows:

^{*}Eastman Chemical Products, Inc., Subsidiary of Eastman Kodak Co., Kingsport, Tennessee

Lard	50°C,	50	40		1
Yellow grease	50°C.	50	40		1
Coconut oil	25°C.	40	30		-
Corn oil	25°C.	50 40 30 30 40 45	20 20		-
Cottonseed oil	25°C.	30	20		1
Peanut oil	25°C.	40	40		0.5
Mono- and diglycerides	25°C.	45	15		5
Mineral oil	25°C.	5	5		0.5
Paraffin	60°C.	60 +	60 ±	V.	0
Propylene glycol	25°C.	50	0		50
Acetone	25°C.	50 60+	40		50 60+
Benzene	25°C.	60+	40		0.13
Ethyl alcohol	25°C.	25	25		100
Glycerol	25°C.	1	0		100 25 1.8
Water	50°C.	0	0		1.8

*TENOX is a registered trademark of Eastman Kodak Company.

These antioxidants, like most hindered phenols, will steam distill at temperatures well below their boiling point. Their volatility is advantageous in the stabilization of solid particles when it is impractical to cover each particle with a spray application. In a liquid oil or fat this volatility often becomes a problem, particularly when heat is applied in the presence of water. Although the pH of the medium has little effect on BHA and BHT, propyl gallate has been found to deteriorate at 300°-400°F. under alkaline conditions.

Some antioxidants, which are not food-approved, may still be satisfactory for cosmetics and lotions. Hydroquinone and its derivatives such as 2,5-di-tert-butylhydroquinone are extremely potent antioxidants with a low order of skin toxicity. Hydroquinone, due to its water solubility and potency, is often used under industrial conditions where the strictly oil-soluble materials have not proved satisfactory. Consideration should be given these types of antioxidants if the food-approved group do not provide adequate protection under existing conditions.

The breakdown of fats is greatly accelerated by heat, light, metals, and other catalysts. Citric and phosphoric acids have been found to be quite effective for inactivating metals in fats and oils requiring nontoxic additives. These acids also have been reported to enhance the effectiveness of the phenolic antioxidants under certain conditions. Most commercial antioxidant formulations contain citric acid as a metal chelating agent because of its low order of toxicity, odor, and flavor.

While no one has been able to prove the exact action of antioxidants, the present theory appears to give a good indication of their stabilizing effect on lipids. Fats, oils, and similar compounds have unsaturated (or unstable) linked atoms in their molecules. Oxygen attacks the molecule at or near this unstable linkage producing aldehydes, among other compounds, which give off odors and flavors. Essential oils, phospholipids, and other fatlike materials are believed to break down in a similar manner. The antioxidant is thought to absorb the energy necessary to break the molecule at its unstable linkage and will in time become oxidized itself. An ex-

cellent summary of this action is given by Blanck (1) for those who prefer to go into more detail on this subject.

Antioxidants, while used alone in some instances, are usually marketed as a complete liquid formulation containing one or more basic antioxidants and a chelating agent or metal scavenger in an edible solvent combination. In many cases antioxidant formulas are tailored for specific use although there are several formulas now being marketed which are used in many fields. Typical formulas now being used in the food, cosmetic, and essential-oil fields are shown in the following table.

Composition	TENOX	TENOX	TENOX	TENOX 7	TENOX R	TENOX
Butylated						
hydroxyanisole	20	20	10	28	20	-
Butylated						
hydroxytoluene	-	20	10	_	_	-
Propyl gallate	6	-	6	12	_	20
Citric acid	4	-	6	6	. 20	10
Vegetable oil	-	60	56		_	-
Mixed glycerides	-	-	Green .	20	_	-
Propylene glycol	70		12	34	60	70
Typical Properties	TENOX	TENOX	TENOX 6	TENOX	TENOX R	TENOX
Color	Lt. straw	Lt. straw	Golden brn.	Lt. brn.	Lt. straw	Lt. amber
Refractive Index,						
20°C.	1.461	1.491	1.490	1.486	1.459	1.468
Specific gravity						
20°/20°C.	1.088	0.978	1.026	1.094	1.124	1.123
oTENOX is a registere	ed trader	mark of I	Eastman 1	Kodak Co	mpany	

Many of the fats used in the cosmetic industry are also used in the food industry and the same antioxidants are generally used in both fields. In general, antioxidants have been found to be extremely effective in animal and mineral fats but less effective in vegetable fats. Typical data showing the potency of commercial antioxidant formulas may be seen in Table 1.

Antioxidants provide the maximum stability only when added in the proper manner. Most complaints arise because antioxidants are added after the oil is in the early stages of rancidity or because the antioxidant is * a standard in the industry...

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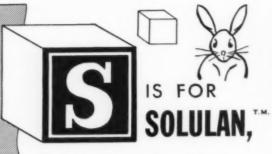
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not completely dissolved in the oil portion. Some cosmetics are extremely difficult to stabilize because of the catalytic effects of water and coloring matter used in the preparation. In general, antioxidants should be thoroughly dispersed in the product as soon as possible after the last manufacturing step in processing the lipid. In fact, most vegetable oils, mineral oils, and animal fats should be stabilized with an antioxidant immediately after the last filtering operation to assure the cosmetic manufacturer of a fresh stable oil. In those cases in which extreme stability is necessary, additional antioxidant may be added by the cosmetic manufacturer to the

oil portion of his preparation.

Most cosmetic preparations vary widely in their specific formula. For this reason it is practically impossible to suggest a specific concentration of any one antioxidant formulation without first testing it at several concentrations. A good technique for obtaining the best antioxidant for a particular preparation is to vary concentrations (from .05% to 1% based on the weight of oil or fat present in the preparation) of a combinationtype antioxidant formula under accelerated test conditions. One of the best techniques for accelerated tests is to place the finished preparation in an oven which can maintain a temperature of about 145°F. Samples should be examined daily by a trained organoleptic panel for evidences of rancid odors or flavors. Another technique which has worked satisfactorily is an evaluation of the oil portion of a preparation by one of the accelerated methods such as the Active Oxygen Method or Oxygen Bomb Method (5). Regardless of the technique used samples of either the oil portion or the finished preparation containing no antioxidant should be compared with samples containing about .05, 0.75, .1, and .5% antioxidant formulation. Comparable samples should also be stored under shelf conditions equal to those used in commercial marketing of the product and examined periodically for off-odors indicating oxidation. Sales Service Laboratories of the antioxidant manufacturers can also be called in to assist in this evaluation.

Antioxidants have greatly increased the marketable life of many fat containing products. When properly used they provide excellent insurance against customer complaints because of fat rancidity and similar off-odors and flavors.

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STABILIZATION OF COSMETIC INGREDIENTS AGAINST OXIDATIVE BREAKDOWN

		Percent Shelf-Life
Sample	Treatment	Increase
Hair-oil preparation		
(20% olive-80% mineral)	TENOX 2	140
Lipstick base	TENOX 2	50
Hand-cleaner base	TENOX 2	100
Lipstick	TENOX 2	100
Lipstick	TENOX 4	400
Castor oil A	TENOX S	100
Castor oil B	TENOX 2	150
Mineral oil	TENOX BH'	Г 500
Mineral oil	TENOX 2	1,000
Medicinal ointment (lanolin,		
stearic acid, cod-liver oil)	TENOX BH.	A 2,000
Medicinal ointment (lanolin,		
stearic acid, cod-liver oil)	TENOX BH'	Т 1,500

THE

Gallate Antioxidants

AND THEIR



Application to Cosmetics

...with Particular Reference to PROPYL GALLATE

REGINALD WILLIAMS, Ph.D., B.Sc. (Lond.), F.R.I.C.

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The discovery of the antioxygenic activity of the esters of gallic acid by Boehm and Sabalitschka (1) in 1938 pioneered the search for the "ideal," non-toxic antioxidant and it is doubtful if later researches have come nearer to that "ideal". In 1943, Boehm and Williams (2) enumerated the requirements of the "ideal" antioxidant for pharmaceutical preparations. They are:

- It must be an effective inhibitor of oxidative processes.
- It must be odourless and tasteless and it must not discolour the preparation to which it is added.
- 3). It should be as nearly neutral in reaction as possible.
- It should be easily and definitely soluble in the oxidisable medium.
- 5). It must be pharmacologically safe and must not be strongly toxic to animal tissues.

From a consideration of the close relationship between drugs, foods and cosmetics, as evidenced by the Federal Food, Drugs and Cosmetics Act, it is not surprising that these requirements, with slight modifications and changes of emphasis, have come to be regarded as the basic, desirable characteristics, not only of the ideal pharmaceutical antioxidant but also of the ideal antioxidant for foods and cosmetics. In the case of cosmetics, for example, their very nature and purpose requires that the non-toxic attribute of the ideal antioxidant should be elaborated to emphasize the importance of its being dermatologically innocuous.

An important aspect of the Boehm and Sabalitschka (1) discovery was that it brought to light not just one antioxidant but an homologous series of them. As with all homologous series the n-alkyl esters of gallic acid show a gradation in physical properties. The solubility in water decreases on ascending the series

and the solubility in fats and oils increases, reaching a maximum at dodecyl-(lauryl)-gallate. This means that by carefully selecting the gallate antioxidant, oxidative processes in almost every type of substrate can be controlled. This versatility has earned for the gallate antioxidants the title "The Jack-of-all-trades" in antioxidant chemistry. (3).

Table I. shows the solubilities of certain esters of gallic acid in almond oil at $20\,^{\circ}\mathrm{C}$

Table I

Table I.	
Gallate Antioxidant	Solubility in Almond
	Oil at 20°C.
Methyl Gallate (Progallin Me)	0.3
Ethyl Gallate (Progallin A)	0.4
Propyl Gallate (Progallin P)	2.25
Octyl Gallate (Progallin O)	3.0
Dodecyl Gallate (Progallin La	3.5
T	

In passing from ethyl to propyl gallate there is a dramatic increase in oil solubility. The propyl ester is 4-5 times more soluble in oils than the ethyl ester, whilst the solubility increase in passing from propyl to dodecyl gallate is about 50%.

All the lower alkyl gallates have been investigated at one time or another, but interest has centered chiefly on n-propyl gallate. It was this member of the series which Boehm and Williams (2) singled out after careful assessment of the lower gallates and put it forward as the "near" perfect antioxidant for pharmacy.

In considering the suitability of an antioxidant for cosmetic preparations it is worthwhile recalling, in summary, the characteristics of n-propyl gallate.

Physical Properties

Pure, anhydrous, n-propyl gallate is a white, amorphous, odourless substance, having a slightly bitter taste, and melting at 146-148°C. When dissolved in a





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substrate at the concentrations necessary to inhibit oxidation it is quite tasteless. The pH value of an 0.2% solution in water is 5.7.

Physiological Properties

The gallates are esters of a naturally occurring acid. Gallic acid is widely distributed in nature as a constituent of the tannins, which are present in many vegetable foods and particularly in tea. The work of Fischer(4) and others has indicated that the tannins are complex mixtures of closely related poly-galloyl glucoses. There is an obvious structural relationship between these compounds and the simple alkyl esters of gallic acid. It was therefore to be expected that these latter compounds would not be strongly toxic. This expectation was amply confirmed by the extensive pharmacological investigations carried out by schools in the United States (5), Britain (2,6), and Holland (7). In the case of propyl gallate, for example, Orten, Kuyper and Smith (5) found that there was no evidence of toxicity in this substance, for amounts at least one hundred times that which would be ingested by the human subject if all the fat in his diet were treated with effective amounts of the antioxidant. But, perhaps, the most convincing proof of the harmlessness of this substance is that it has been used in foods in the United States and Canada for the past nine years without a single report of any toxic or allergic symptom.

Of particular interest to cosmetologists are the skin tests carried out by Coward and Dyer, and reported by Boehm and Williams (2). They showed that no acute skin effects were observable when a 10% solution of propyl gallate in propylene glycol was left in contact with shaven guinea pig's skin for 48 hours or human skin for 24 hours. This means that propyl gallate in concentrations 200-1000 times greater than those normally used in cosmetic preparations does not pro-

duce any dermatological reaction.

Activity

The principal non-toxic antioxidants in general use today are n-propyl gallate, n-octyl gallate, n-dodecyl gallate, butylated hydroxy anisole (BHA) and butylated hydroxy toluene (BHT). Of these antioxidants the most active is unquestionably propyl gallate. In Table II the antioxidant activities of propyl gallate, BHA, and BHT, are compared (8).

Table II Stability by Active Oxygen Method.

Antioxidant	Lard	Cotton Seed oil 0.5%	Hydro- genated Cotton Seed Oil. 0.05%
	hours.	hours.	hours.
Control	4.1	9.1	121
Propyl Gallate	43.8	54.9	495
Butylated Hydroxy Anisole	19.3	7.3	158
Butylated Hydroxy Toluene	22.7	14.6	172

That propyl gallate holds pride of place amongst the gallate antioxidants is quite obvious from theoretical considerations. The activity of the gallates derives from the three adjacent hydroxyl groups in the molecule i.e., from the pyrogallol nucleus. It therefore follows that those members of the series of lower molecular weight will be more active weight for weight than

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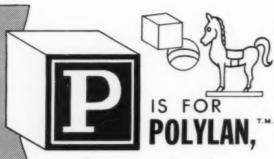
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those of higher molecular weight. The results obtained by Morris, et al (9) summarised in Table III, confirm this conclusion.

Table III

Evaluation of Propyl, Octyl & Dodecyl Gallates in Lard at concentrations of 0.01%

Antioxidant	Stability by the Active Oxygen Method. Hours.
Control	7
Propyl Gallate	70
Octyl Gallate	60
Dodecyl Gallate	45

It is interesting to note that in spite of the growing tendency to resort to the use of mixtures of antioxidants, in an effort to resolve the wide variety of different problems in autoxidative chemistry, the formulations recommended for high activity and excellent shelf-life invariably contain propyl gallate as an indispensable, essential ingredient.

Metal Deactivators

Trace metals, e.g., copper and iron are strong oxidation catalysts. It is perhaps, not sufficiently well realised that the elimination of trace metals from a substrate or the complete suppression of their prooxidant activity can be just as important a factor in fat stability as the addition of an antioxidant. Certain acidic substances, especially citric acid and its esters form complexes with trace metals and so suppress their pro-oxidant effects. When therefore these substances are used in conjunction with phenolic antioxidants the activity of the latter compounds is remarkably increased. In the case of the gallates these metal deactivators have an added significance for they help to overcome the one inherent defect in the lower gallates, viz., their tendency to discolour in the presence of iron.

Cosmetics and Antioxidants

The requirements of the cosmetic antioxidant whilst being largely similar to those of the food antioxidant, also differ from them in certain important details.

Cosmetics are products of artistry and elegance, each one having a character and individuality of its own. Any additive which preserves their distinctive feature is to be desired, but it is essential that the additive should in no way modify or impinge upon the original creation. For example, a cosmetic is characterised by its delicate aroma. A preserver which interferes with this carefully formulated fragrance is to be avoided. The importance of an absolutely odourless antioxidant for cosmetics is therefore obvious and in this respect certain members of the gallate series stand alone; they are propyl, dodecyl, cetyl (Progallin CE) and stearyl (Progallin ST) gallates.

Great emphasis has been laid on the fact that a food antioxidant should have "carry through" properties to protect the fat content of baked foods. Obviously, this property is of lesser significance in the case of cosmetics, since they are rarely if ever exposed to alkaline conditions at high temperatures. The factor of overwhelming importance to the cosmetician is that the antioxidant should effectively prolong the shelf-life of his product and there can be little doubt that for this purpose the gallates are the antioxidants of choice.

For various reasons antioxidant additions to food have been limited by law to an absolute minimum. No such rigid restriction has been applied to cosmetics. This is not to suggest that antioxidants should be used indiscriminately and with abandon in cosmetics but it does make possible the use of antioxidants at their optimum concentrations, provided these concentrations do not give rise to toxic and dermatological effects. This point is of little significance to phenolic antioxidants generally, since most of them exert their maximum effects at about 0.02%. But in the case of the gallates it is a factor of some importance. A frequent criticism of phenolic antioxidants is that they are not sufficiently effective in vegetable oils. This criticism is largely justified for most phenolic antioxidants except the gallates. For at concentrations of 0.05-0.1% the gallate antioxidants are highly effective in vegetable oils. See Table IV and V.

Table IV Stability by Active Oxygen Method (8)

		Oil Cotton S		Hydroge Cotton Se		
Antioxidant	0.01	0.05	% 0.1%	0.01%	0.05%	0.1%
Control Propyl	9.1	9.1	9.1	121	121	121
Gallate	15.8	54.9	79.5	172	495	614
B.H.A.	6.6	7.3	7.3	108	158	172
B.H.T.	9.4	14.6	18.0	118	172	184

Table V

Peroxide numbers of vegetable oils, stored in closed containers at room temperature (2)

	Soya Bean Oil Almond Oil Coconut Oil									
	Soya Bean Oil			Alı	nond	Oil	Coconut O			
	24 days	39 days	93 days	8 days		101 days	28 days	45 days	240 days	
Con-										
trol 0.01%	16	28	65	77	130	441	2	2	28	
Propy	yl									
Gal-										
late	3	7	14	42	57	131	1	1	8	
0.05% Propy	v]									
Gal-										
late	3	7	11	31	32	40	1	1	5	
0.10%										
Propy	v1									
Gal-		_							_	
late	3	7	10	30	32	40	1	1	3	

Applications

Three examples have been chosen to illustrate the usefulness and effectiveness of the gallate antioxidants in cosmetics and cosmetic materials.

(a) Wool alcohols

Wool alcohols are emulsifying agents used in the preparation of many cosmetic creams. On exposure to air they undergo characteristic chemical and physical changes which can make them quite unsuitable for the preparation of emulsions. Furthermore, it is not uncommon to find that emulsions made from wool alcohols break down on long storage. The work of Seymour et al (10) showed that these changes, involving increases in the acid and saponification values of the wool alcohols, are retarded by small additions of Propyl Gallate. Two emulsions of the following formula, the one containing 0.007% w/w of Propyl Gallate, were prepared and their acid values determined during storage:

THE WOOD WOOD AND THE STATE OF	Cater and	GOOTER
Wool Alcohols		20
Paraffin Wax		100

White Oil (viscosity	
74 Redwood (seconds)	20
Water	68

When the acid value of the control sample had doubled, the emulsion separated, but in the same period the acid value of the sample containing Propyl Gallate was unchanged and the emulsion intact. It has been suggested that where these alcohols are highly contaminated with trace metal impurities, the addition of a higher gallate, e.g., cetyl gallate at a concentration of 0.01% would be better for this purpose.

(b) Emulsions

Creams and emulsions form a large proportion of cosmetic products. Table VI, shows the effectiveness of Propyl Gallate in inhibiting the oxidation of olive oil in an Antiseptic Lanette Wax cream of the following formula:

Stearyl alcohol	7
Lanette Wax	14
Olive Oil	20
Propylene Phenoxetol	2
Nipasol M	2
Nipabenzyl	2
Water	46
Glycerol	7

Table VI

		Peroxide number after						
		5 days	14 days	21 days	55 days			
	Control	15	22	58	76			
0.02%	Propyl Gallate	4	11	20	19			

The concentration of Propyl Gallate is based solely on the weight of olive oil.

(c) Essential Oils

Essential oils differ markedly in their tendency to oxidise during storage. Lemon, orange, fennel and lavender oils oxidise very readily; bergamot and rosemary oils are a little more stable; clove and cinnamon oils are even more stable to oxidation. Fryklof (11) has made a considerable study of this subject and his work shows that Propyl Gallate is a very good antioxidant for essential oils. Working at concentration levels of the order of 0.01% he showed that the protective influence of Propyl Gallate increased with increasing concentrations and that this influence was enhanced by adding small percentages of citric acid. The value of the gallate antioxidants in essential oils has recently been officially acknowledged in Great Britain in "The Antioxidant in Food Regulations, 1958" where Propyl-, Octyl-, and Dodecyl-Gallates are permitted in essential oils in concentrations of up to 0.1%.

It will be appreciated that it is quite impossible to deal with all the various applications of the gallates to cosmetics in the limited space available, but the examples given serve to indicate the wide applicability of these compounds and the significant role which they play in retarding autoxidative changes.

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Nature of

OXIDATIVE DETERIORATION

of Cosmetics

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Both are members of the University faculty. Dr. Privett is head of a section that is concerned with research in the chemistry and technology of fats and oils, and holds an appointment as associate pro-

 fessor on the University staff. Dr. Lundberg is the executive director of The Hormer Institute, and a professor of agricultural biochemistry.

The number and types of cosmetic preparations are unbelievably large, and exodative deterioration manifests itself in such products in one or more of several characteristic ways: off-odor, off-flavor, discoloration and toxicity. The typical off-odors of rancid fats occur in some cases; in other cases off-odors manifest themselves by loss or deterioration of fragrance. Added perfumery agents may be oxidized directly or as a consequence of oxidation of fatty components.

Some perfumery chemicals such as eugenol, vanillin, heliotropin, coumarin and methyl anthranilate function as antioxidants because of their ease of oxidation. While this may appear to be beneficial, oxidation of these compounds is usually accompanied by some form of discoloration or other undesirable effects. Discoloration due to oxidation may take on many forms, and often may be identified by the appearance of yellow patches on exposed surfaces.

Off-flavors in cosmetics generally are the same as those that are characteristic of rancid fat.

Toxicity resulting from oral ingestion of cosmetics is rare and purely accidental. The main toxicological problem in cosmetics involves irritant or allergic reaction on the skin. Peroxides are listed as primary cutaneous irritants, although other substances also present problems in this respect. Certain antioxygenic substances are also listed as allergens or irritants (12). Among these are gum acacia, gum arabic, monobenzl ether hydroquinone, paraphenylenediamine and some paraaminobenzoic acid derivatives.

In addition to the effect on such aesthetic properties as odor, flavor and color, oxidative deterioration of fatty components may be responsible for inferior quality in other respects. For example, oxidative changes in wool alcohol and wool fat are accompanied by detrimental effects on their emulsifying properties.

Factors Affecting Oxidative Deterioration.

The choice of fats and oils used in the manufacture of cosmetics is governed by many factors, and economic considerations are not among the least important. Nevertheless, it is mandatory in the interest of good stability that the proportions of polyunsaturated materials be as small as possible. Oils containing appreciable amounts of linoleic and higher unsaturated fatty acids are often partially hydrogenated to increase their stability.

The pro-oxidant effects of certain metals, noteably iron and copper in fats and oils have been observed by many people; light, moisture, increase in temperature, free acid, and the presence of proteinaceous contaminates also exert pro-oxidant effects. Thus it is important in the interest of good stability to maintain high standards in the selection of raw materials, and to take appropriate precautions in the handling and manufacturing process to avoid metal contamination as well as other possible sources of pro-oxidant activity.

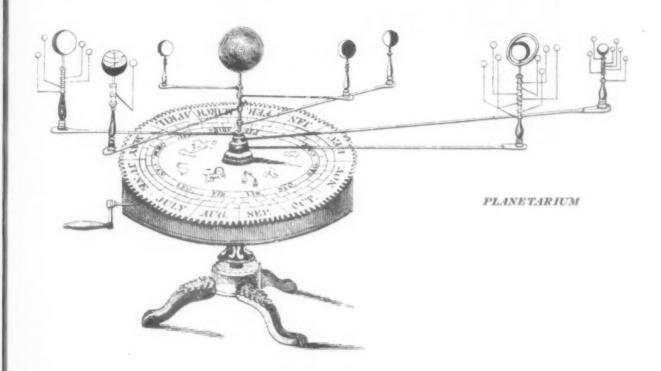
Stabilization of Cosmetics

Since most cosmetic preparations contain unsaturated constituents, they are prone to oxidation on exposure to atmospheric oxygen, and the use of antioxidants to inhibit autoxidation is a valuable adjunct to good manufacturing practices. In general, the stabilization of common fats and oils used in cosmetics such as castor oil, lard, corn oil, oleins and mineral oils involve the use of antioxidants which will efficiently interrupt the chain reaction of autoxidation. In addition to effectiveness as inhibitors of autoxidation, compounds used for the stabilization of oils which go into cosmetics must be innocuous, compatible with perfumery chemicals, and, because most cosmetics are white, have a low order of color. They also must be unaffected by light, heat, moisture and free acid.

The most widely used natural antioxidant for edible fats and oils is Nordihydroguaiaretic acid (NDGA). It is a catechol derivative and has proved to be a very

^{*}Hormel Institute, University of Minnesota

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powerful inhibitor of autoxidation. In addition to stabilizing edible fats, many of which are used in cosmetics, it is effective in such substances as phospholipides (19, 20), paraffinic and chemically similar materials (15), essential oils, water in oil emulsions (18), and other fats and oils which go into cosmetics.

NDGA is widely used for the stabilization of essential oils and is particularly effective in the citrus oils as well as such oils as fennel, lavender, anise, bergamot, peppermint and rosemary (7, 8, 10, 17).

NDGA has been widely tested and used in animal fats. and there is a large mass of data which demonstrate its effectiveness in these fats, particularly lard (13, 21, 22). It also is one of the best antioxidants for the stabilization of vitamin A and fish oils (1, 3, 5, 9).

Vegetable oils, such as corn oil and cottenseed oil which are finding their way into cosmetics, as well as olive, palm, coconut and sesame also are protected against oxidative deterioration by the addition of minute amounts of NDGA.

NDGA responds well to the presence of many synergists and is used very frequently in combination with compounds such as citric acid, ascorbic acid and phosphoric acids which supplement its activity. Lehmann and Watts (11) found that sodium hexametaphosphate and sodium ascorbate were powerful synergists for NDGA in lard and creams. NDGA also is used in combination with BHA and BHT, and Chenicek's patent (4) demonstrates the synergistic activity of 4-alkoxyphenol having at least one ring H substituted by an alkylthioalkyl group with NDGA.

NDGA also has been shown to exert antibiotic activity and inhibits the growth of certain common molds that grow in fats (16)

The formation of oxidized flavors in cosmetic makeups and creams of various types may also be prevented by NDGA. Polyphenolic antioxidants also are effective in preventing rancidity in creams made from such oils as apricot, almond and peach oils (14). The color of cosmetics such as toilet water, perfume and shaving lotions which contain light sensitive dyes may be stabilized by the addition of polyphenolic antioxidants in combination with acids such as fumaric, tartaric, maleic and acontic acids (2, 6).

In summary, it may be stated that the stabilization of cosmetics may be approached in several ways, (1) selection of high quality raw materials, (2) good handling and manufacturing practices, including precautions to avoid metal and other forms of pro-oxidant contamination and (3) protection against oxidative deterioration through the use of antioxidants such as NDGA. The latter is particularly effective in the stabilization of oils and fats used in cosmetics.

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ANTIOXIDANTS

L. R. DUGAN*

L. R. Dugan has been employed by the American Meat Institute Foundation, Chicago, since 1946. In 1949 he was made chief of the division of organic chemistry.

Foods, cosmetics, pharmaceuticals, gasoline, rubber, and many other materials have benefited from the use of antioxidants to retard rancidity. This has resulted from a better understanding of how an antioxidant works, from development of antioxidants having desirable properties, and from desire and need to preserve nutritional value and important physical and chemical properties. Antioxidants occur naturally in many crude organic materials of an unsaturated nature but the processing necessary to provide products with desired properties frequently removes or destroys these natural antioxidants and synthetic antioxidants, have assumed an increasingly important role. The naturally occurring antioxidants have long been favored for food uses, however, some of the synthetic antioxidants developed for use in gasoline and rubber have been adapted with great success to food and other uses after being tested for effectiveness, compatibility, and toxicity.

The desirable features of an antioxidant are that it is effective at low concentrations, does not impart undesirable characteristics to the system in which it is used, is conveniently and safely handled, and is low in cost. In addition to these features, the choice of an antioxidant will be governed by the requirements of the system and the characteristics of the available antioxidants.

How antioxidants function

To understand how an antioxidant functions it is necessary to consider first what happens when an unsaturated fatty acid or other molecule becomes rancid through reaction with oxygen. The autoxidation of an organic molecule involves reactions in which free radicals are formed and react in a series of reactions called a chain reaction. This reaction chain involves three

stages which are known as the initiation, the propagation, and the termination stages,

Initiation takes place through activation by heat, light, metal catalysts, etc., of an unsaturated acid in a fat. The free radical thus formed reacts with oxygen from the air to form a peroxy radical. This peroxy radical then reacts with another unsaturated molecule to form a hydroperoxide and another radical. This is the propagation stage. Termination results from interaction of radicals to produce inert substances which no longer contribute to the reaction chain.

These steps may be represented simply by the following equations where RH represents an unsaturated fatty acid, etc., R• a free radical, and ROO• a peroxy radical.

RH + initiator → Free radical R.

 $R \cdot + O_2 \rightarrow ROO \cdot$

 $ROO \cdot + RH \rightarrow ROOH + R \cdot$

R· + R· → Inert products

 $R \cdot + ROO \cdot \rightarrow Inert products$

Antioxidants react with the chain-carrying radicals to form inert products in one of the termination steps. Peroxy radicals, ROO*, probably predominate in this termination step since hydrocarbon radicals react very readily with molecular oxygen.

Sterically hindered antioxidant compounds are more effective than non-hindered since radical reactions can occur under conditions of steric hindrance which rule out molecular reactions of any kind. Hindered compounds then should react more slowly with oxygen and hydroperoxides and thus be maintained for the chainstopping radical reactions. All inhibitors are a compromise between the sensitivity necessary to terminate oxidation chains and the stability to withstand direct attack by oxygen. Phenolic compounds and aromatic amines are most widely used as oxidation inhibitors.

^{*}American Meat Institute Foundation, University of Chicago

Catalytic decomposition of hydroperoxides formed in oxidizing systems provides another mechanism by which a system can be protected against oxidation. An important feature of this decomposition process is that the primary stable products are not free radicals. This naturally rules out the decomposition of peroxides by metals such as copper, cobalt, and iron. Sulfur compounds are very effective decomposers of peroxides.

Testing for Stability

The development of oxidative rancidity in fatty materials proceeds through formation of hydroperoxides which break down by interaction with other materials or further oxidation to form aldehydes, ketones, and acids. The characteristic odors and flavors of rancidity are due to the secondary products rather than to the peroxides. The determination of rancidity and stability is based on the recognition and measurement of peroxidic materials (or the secondary products) formed during oxidation. Stability may be measured by the time required for rancidity to be developed under conditions of storage. Methods for accelerating the oxidation and rancidification of fatty materials are commonly employed in order to shorten the time for evaluation of the stability of the product or the efficiency of the antioxidants added to maintain stability.

The method most commonly used for evaluating stability of a fat is the Active Oxygen Method or Swift Stability Test. Air is bubbled at a constant rate (2.33 ml./sec.) through the fat held at boiling water temperature or for a 2.5 fold decrease in time it is held at 110° C. The time for a specified peroxide value to be attained is a measure of the stability of the fat or of the effectiveness of the added antioxidant when compared with a sample containing no antioxidant. A peroxide value of 20 me/kg. was correlated with organoleptic rancidity in animal fats and 100 me/kg. for vegetable oils and hydrogenated fats. Uniform methods are now being established using a peroxide end-point of 100 me/kg. for all fats. This compensates in part for the varying peroxide values at which organoleptic rancidity may be detected when antioxidants are used.

The oven test was developed by the cracker and biscuit industry to provide a relative rating to the shortenings used. Since it is run at temperatures only moderately greater than those found in ordinary storage conditions, it provides an evaluation of antioxidant efficiency which more nearly rates a product as a user will find it. The samples are stored in scrupulously cleaned glassware in ovens at 63° C. Keeping quality and antioxidant effect are measured by the time required for organoleptic evaluation of rancidity or peroxide accumulation to predetermined values.

The ASTM Bomb Method is a new rapid method which involves subjecting the fat or food sample to 50-100 psi pressure of pure oxygen at 212° F. Rapid absorption of oxygen by the sample (measured by a decrease in oxygen pressure) denotes the end of the induction period and onset of rancidity. The longer the induction period, the more stable the sample and the more effective the anti-oxidant providing this stability. A significant correlation between this test and the oven test has been shown.

Other tests now applied to detecting rancidity are colorimetric carbonyl determinations and the use of 2-thiobarbituric acid which reportedly measures malonaldehyde produced in the early stages of oxidation.

Antioxidants in Use

Compounds used as antioxidants are derived from a broad spectrum of organic and some inorganic types. The commonly used classes of compounds are derived from classes composed of organic phosphates, phospites, thiophosphates, sulfides, disulfides, thiazines, dialkyl selenides, arylureas, quinolines and various heterocylic materials.

Antioxidants used in foods must be approved for safety through long-term chronic toxicity tests and acute toxicity resulting from massive doses. Levels of safety many times greater than those required to provide the antioxidant protective effects are required.

The antioxidants now permitted for use in foods are butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), the alkyl gallates such as propyl (PG), nordihydroguaiaretic acid (NDGA), trihydroxybutryophenone (THBP), tocopherols, lecithin, citric acid, monoisopropyl citrate, ascorbic acid, ascorbyl palmitate, phosphoric acid, thiodipropionic acid and its lauryl and octadecyl esters. BHA is a mixture of 2-, and 3,-t-butyl-4-methoxyphenol. BHT is 2,6-di-t-butyl-4-methylphenol, and T.H.B.P. is 2,4,5-trihydroxybutyrophenone.

The substituted mono- and polyphenols are most desirable because of their effectiveness, relative freedom from color problems and usually low toxicity. The effects of position and nature of substitution are shown by the data in *Table 1*. Lard was stabilized most effectively, as

 $Table\ 1$ Relative Effectiveness in Lard of Phenolic Antioxidants

Antioxidant 0.01%	A.O.M. Stability Hrs.
None (control lard)	9
Hydroquinone	115
Tert-butyl hydroquinone	96
4-methoxyphenol	18
2-t-butyl-4-methoxyphenol	36
t-butyl guaiacol	11
3-t-butyl-4-methoxyphenol	27
2,5-di-t-butyl-4-methoxyphenol	26
4-t-butyl-phenol	10
None (control lard)	10
2-n-butyl hydroquinone	86
Hydroquinone mono-lauryl eth-	er 16
2-hydroxy-5-methoxy-benzylalco	ohol 25
Mono-n-butyl-4-methoxyphenol	29
2-methallyl-4-methoxyphenol	30
Hydroquinone-mono-n-butyl et. Tert-butyl-hydroquinone-mono-	
butyl ether	38
2- <i>t</i> -butyl-4-methoxyphenol	40

measured by A.O.M. tests, by alkyl substituted hydroquinones. Next in order of effectiveness were the 2-tbutyl-4 alkyl ethers of hydroquinone and then the other alkyl substituted 4-alkyl ethers of hydroquinone and and finally, the mono-ethers of hydroquinone.

One of the most important features of an antioxidant for food uses is that of "carrythrough." This term is applied to the capability to survive processing temperatures, such as those encountered in baking and frying of foods, and to stabilize effectively the products being prepared from the stabilized fat or oil. "Carrythrough" is not common to antioxidants but is characteristic of the compound used and the system into which it is incorporated. BHA and BHT are the best "carrythrough" antioxidants currently in use. There is no relation between the A.O.M. stability of the fat and the stability of the product into which stability is carried. This is shown by the data in Table 2. Bulky substituents, such as a t-butyl group ortho to the OH in a phenolic

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Table 2

A.O.M. Stability and Carrythrough Effects
of Antioxidants in Lard

Antioxidant 0.01%	A.O.M. Stability (Hrs.)	Oven Stability (Hrs.)			
		Pastry	Crackers	Potato Chips	
Control (Lard)	9	85	130	72	
BHT	37	410	920	700	
2,6-dipropenyl-4-					
methoxyphenol	32	215	240	150	
BHA	32	1200	940	860	

antioxidant, are most effective in conferring carry-through and also aid in fat or oil solubility of the antioxidant. Antioxidants without this characteristic grouping and those with appreciable water solubility are unable to provide good "carrythrough." Thus, while propyl gallate and hydroquinone are powerful antioxidants, they have very little "carrythrough." The temperatures of processing are also important to carrythrough and prolonged heating at high temperatures destroys antioxidant activity by altering, destroying, or distilling off some of the antioxidants used.

Synergism

Antioxidants frequently are used in conjunction with acidic materials which enhance the antioxidant effectiveness. These materials are known as synergists and those generally used are citric acid, ascorbic acid, phosphoric acid, and certain esters and salts of these acids. Other materials have been found to exhibit synergism and these include amino acids, thio-acids, thio-ethers, phytic acid, and glucuronolactone. An example of synergism is shown in Table 3.

 $Table \ 3$ Synergism Effects with BHT in Lard

Antioxidant	A.O.M. Stability (Hrs.)	Synergism (Hrs.)
Control lard	121/2	
BHT 0.01%	451/2	
Citric Acid 0.002%	14	
Phytic acid 0.002%	131/2	
BHT + CA	$50\frac{1}{2}$	3
BHT + Phytic acid	52	5

A characteristic usually found in synergists is the ability to chelate with pro-oxidant metals such as copper, iron, nickel, cobalt, etc., which frequently are found in trace amounts in fatty materials.

Not all synergism is due to metal deactivation however. Phosphoric acid, phosphatides, thio-acids and ethers, and others act to decompose peroxides to inert non chain-carrying products and thus extend the useful life of an antioxidant. Many phenolic antioxidants, when used in conjunction with others, also exhibit a mutual sparing effect which results in antioxidant activity greater than that which can be attributed to the summation effects of each used alone in the same substrate. Thus the term synergism is applied to a number of effects which enhance the activity of an antioxidant.

Some Applications of Antioxidants

The vegetable oils contain naturally occurring antioxidants such as tocopherols which provide good stability in some cases. Hydrogenation to lower the polyunsaturate content of a fatty material also has stabilizing value since saturated materials and those having mono-unsaturation are markedly resistant to oxidation unless activated by pro-oxidant effects, such as temperature, light, high energy irradiation, or trace metals.

The effects of hydrogenation on stability of fats and oils and of antioxidant effectiveness in various fats and oils is shown in *Table 4*. Antioxidants such as BHA and

Table 4
BHA and BHT in Natural and Hydrogenated
Fats and Oils

	A.O.M. Stability (Hrs.)				
Antioxidant	Lard	Hydrogenated Lard	Cottonseed oil	Hydrogenated Cottonseed oil	Butter
Control	11	45	15	240	32
BHA 0.01%	46	52	15	275	140
BHT 0.01%	53	55	16	290	90
BHA 0.01%+					
BHT 0.01%	102	106	171/2	315	215

BHT provide markedly greater increases in stability in animal fats than in vegetable oils. They are somewhat more effective in hydrogenated vegetable oils. The relative effectiveness of BHA and BHT in butter is a reflection of their general behavior in beef fats in general which includes butter, tallow, and oleo oil. BHA and BHT are essentially equal as antioxidants for a fat like lard when used at the 0.01% level. Higher levels of BHA have very little effect but higher levels of BHT provide progressively greater stability. BHA and BHT are generally more effective in a 1 to 1 combination in systems to which they impart stability than either antioxidant used alone at a total equivalent concentration.

Tasting is Necessary

Many fats, oils, modified fats and fat derivatives. vitamins, phosphatides, and other unsaturated materials are used in cosmetics. It might be reasoned theoretically, that almost any antioxidant having properties which make it compatible with the system would serve to stabilize that system. Unfortunately, this reasoning does not apply in the general sense. One has only to compare data of a series of antioxidants in one substrate with that for the same series in another substrate to find differences which frequently vary extensively. Another fallacy results from attempting to translate data acquired in a simple system to a complex system in which the simple system is a part. Many antioxidants will stabilize a fat effectively but are ineffective when the same fat is incorporated either into a dry complex system or one in which water and oil or fat are emulsified together with other materials.

Progress has been made in stabilizing complex systems. The monoglycerides from lard of cottonseed oil can be stabilized with glycine and phosphoric acid. Vitamin A in oil media is stabilized by tocopherols and lecithin but in aqueousdispersions it is more effectively stabilized with sodium ascorbate. Other aqueous fatty glyceride systems, complex foods, and pharmaceuticals have been stabilized with phenolic antioxidants such as N.D.G.A. or BHA and normally molecularly dehydrated alkali metal phosphates or sodium ascorbate. Even with the wealth of knowledge concerning the use of antioxidants, it is necessary in all cases to establish by suitable testing testing that a given antioxidant or antioxidant combination will provide the stability desired in each and every given system.



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AERO SCRIPTS

Jack Pickthall*

t is possible that this is my last Aeroscript. Just over two years of the most friendly co-operation with my good friend Mr. Lambert. I think it time for new blood and new enthusiasm.

Rather strange that Mr. Herzka should be in the U. S. when our book was released. Perhaps he will bring back a first hand report of the reception it received over there. To date, before journal reviews can be expected, the letters and 'phone calls have been most gratifying. Looks like a reprint or re-write in record time.

The advertisements featuring methylene chloride (or dichloromethane CH₂Cl₂) should certainly appeal to the manufacturers intent upon shaving off the few odd cents in production costs, especially in the highly competitive industrial fields. It may be used to replace odorless petroleum products, it acts as a pressure depressant and possesses excellent solvent properties. On the other hand, one should not lose sight of the corrosion risks if this chemical is used in aqueous media.

It has always been my opinion that pressure-packed pharmaceuticals have a tremendous future. I have often stressed the great importance of a tight contact between the aerosol producer and the doctor. If you have no effective knowledge of the world of medicine, then your entry into anything to do with pharmaceuticals must be with extreme caution. I was therefore more than pleased to read Edwin Pomerantz (Drug & Cos. Ind., October, 1958) "as a representation of the pharmaceutical industry" on the "self-energised package". The angle stressed by Pomerantz (competition in the pharmaceutical world) differs from the approach of most writers on pharmaceutical aerosols. He gives the example of how many pharmaceutical products are flavoured to provide a "plus factor". Now, he sees the push button application as a means of stepping up sales. Pomerantz claims that if all active ingredients and base compounds (in pharmaceuticals) were inherently stable and mutually compatible, then many research problems would be eliminated. He mentions how vitamins such as "A" and ascorbic acid are adversely affected by light and moisture and also, by trace metals. Also, ascorbic acid will destroy vitamin B and excess ferrous ions will destroy both unless the system is anhydrous. In alkaline medium certain antibiotics lose potency when exposed to moisture. Further, some analgesics are adversely affected by light and moisture. The writer sees the metal or opaque plastic coated aerosol container as the answer to many such problems. Propellants, formulations, valves and containers are discussed. His summary, under the heading 'Areas for Investigation' is well worth repeating.

"There are still certain problems in pharmaceutical aerosol technology to be overcome. I suggest that these areas be investigated:—

1. A more-or-less "universal" can lining is needed which will be completely innocuous and can be applied without leaving "pin holes". Perhaps a member of the silicone family will be satisfactory if the economics and technology permit. This approach has proven quite satisfactory with injectable vials.

2. A more versatile line of delivery spouts is necessary to allow for the administration of throat sprays, of oral products directly without a spoon or dropper, of nasal sprays, of ear and eye drops, of vaginal and rectal creams, and, perhaps of injectables. Mention of injectables may seem odd, but investigators are now attempting to administer medicinals in solution subcutaneously through the pores of the skin by pressure and thus eliminate hypodermic needles. Aerosols would certainly supply the pressure, and perhaps, the idea is not so far-fetched as it sounds initially.

 A nontoxic propellant of the halogenated hydrocarbon class could be used for topical applications to mucosol membranes.

4. A nontoxic propellant of the halogenated hydrocarbon class which will not emulsify or otherwise combine with aqueous or other liquid concentrates, would be valuable. Products could be dispensed in a nonaerated form and yet maintain a liquid propellant reservoir so that the pressure of the package remains constant throughout its use. If this is not possible, then some system must be devised to maintain a constant pressure in Nitrosols.

Many liquid pharmaceuticals are administered in 5 cc. doses. Because of this, there is a need for glass containers which can hold twelve or more ounces at 90 or greater psig. If the glass companies hope to remain competitive in this area, larger containers than those currently available are needed.

Outlook for the future. The future for pharmaceutical aerosols holds a great deal of promise not only for the consumer, but also for the pharmacist and the pharmaceutical manufacturer. For instance, certain pharmacies now wish to prepare their own aerosol products, so they can compound specific prescriptions utilizing this relatively new method of packaging. Many bulk liquid products are currently supplied to the druggist in glass containers. He, in turn, has to subdivide the product into smaller containers for each prescription he fills. Not only is this procedure time consuming, messy and often wasteful, but instability of the active ingredients may be encountered because of the product's continual contact with air. It probably won't be too long before these bulk shipments to the druggist will also be pressure-packed."

Packers of insecticides will have been interested in D.B. Whitlow's article on DIAZINON. Its properties are elaborated and formulae indicated. Whilst on the subject. I have received an excellent pamphlet from Stafford Allen. I quote from their note 'Ideal for Aerosols'. Being completely soluble in Arcton 6 and 9 or Arcton mixtures, PYRACTONE is entirely suitable for Aerosols, where its clarity avoids possibility of clogged valves. This clarity on dilution with solvents such as Arcton, kerosene, heavy mineral oil, etc., is of fundamental importance to manufacturers of fly-sprays. PYRACTONE is wholly compatible with DDT, BHC (Lindane) and other synthetic insecticides-indeed to ensure 100% mortality, especially at sub-lethal doses. Stafford Allens recommend the inclusion of a further 0.1% Lindane in the finished insecticide.

I am glad to see I have a seconder for my liking for glycerin in Aerosols (Prussin and Shepherd, Soap & Chemical Specialties October, 1958). Although they discuss the use of glycerin in non-food types, they say food processors should be interested in the following properties contributed by glycerin to pressure-packed foods.

- 1. Modifying rheological properties.
- 2. Increasing body of product.
- 3. Providing lubricating effects.
- Altering the solubility of gases.
 Increasing stability of emulsions.
- 6. Increasing solubility of flavours and colours in good products.
- 7. Contributing valuable preservative properties to the product.

I have been waiting for someone to give us an insight into the possible use of transparent solid CO₂. In the 'Aerosol Age', October, 1958, L.W. Haase writes on "Dry Ice as an Aerosol Propellant". This is a first rate article and fully justifies my quoting the summary. "These observations on the behavior of carbon dioxide have importance in connection with its use in the form of transparent dry ice as a propellant in pressurized packages. Particularly important is that

Continued on page 78

* Chief Chemist Polak & Schwarz, England, Ltd.

aromatics...from Felton

Imagination ... integrity ... experience ...
absolutely the finest raw materials – these are the simple yet overwhelmingly important reasons for Felton's successful aromatics, specialities and fragrances for the perfume industry. Consult us regarding your latest ...
product development plans.

Sales offices and plants in major cities, Canada and overseas



PRODUCTS & IDEAS

PIPETTING DEVICE

A new pipetting device, the Pumpett Automatic Pipette Control, makes it unnecessary to fill a laboratory pipette by mouth suction, which can be dangerous as well as distasteful. The



Pumpett is designed for operation with one hand, either right or left. The thumb presses a large rubber bulb at the top to provide suction, and the forefinger operates the coarse air control valve. For micro quantities, a small internal rubber bulb, depressed by a control knob screw, can be operated independently. This micro bulb controls filling and discharge so accurately, reports the manufacturer, that the Pumpett can even replace expensive burettes. The operator keeps

liquid under constant observation at eye level. It is especially recommended for safety where corrosive, toxic, or infectious liquids and sterile or radioactive solutions are handled.

TEST TUBE RACKS

Polyethylene test tube racks are now being distributed by the General Scientific Equipment Co. According to the manufacturer, these racks are lightweight, unbreakable and chemical resistant, and come in a variety of sizes.

AROMATIC MATERIAL

A new aromatic material, Omegalacton 605, has been produced by N. V. Sluys Boechout. It is a lactone, the odor of which is strongly reminiscent of the classical macrocyclic lactones, but which, according to the manufacturer, has perhaps a more universal suitability owing to its characteristic specific odor combined with extraordinary fixating and exalting properties.

STAPLER-1

Container Stapling Corporation's new "Clip-Top" Packer is equipped with an automatic mechanical trip which clenches the staple and retracts instantaneously, according to the company. It reportedly drives King-Size staples at the rate of 400 per minute, closing filled cartons from the outside. An adjustor screw controls flute thickness.

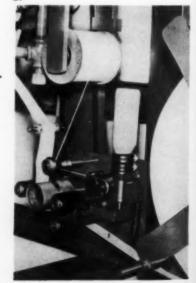
FACSIMILE PACKAGING

Facsimile Packaging, an entirely new method of die-cutting and heat sealing drug and cosmetic samples in an unusually shaped package, has been developed by the Ivers-Lee Co. With facsimile packaging, Ivers-Lee now offers its flexible film Unit-Packaging in shapes that duplicate any miniature bottle, tube, box, trademark or promotional design. Liquid, solid, or powder samples, in a facsimile package, provide an excellent means of promoting trade and consumer product identification.

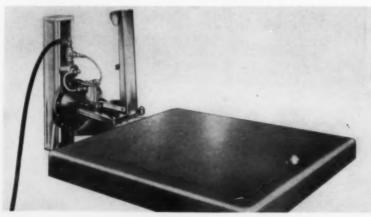
TEAR-BAND TAPE-2

Manufacturers who ship in corrugated paper cases may greatly increase the reuseable life of each case as well as build customer good-will by sealing with a quick, "easy-to-open tear-band tape. A narrow tear-band is applied down the middle of the sealing tape, simultaneously with the sealing operation, by means of the General Corrugated Machinery Co.'s new tearband attachment to their Automatic Tape-Case-Sealers. A die-cut tab is provided in each end of the tape to enable customers to start the tearband release.

2.







There's nothing like a new hat



And there's nothing like a new Goldcôted Richford Basket-Weave Cap to transform ordinary jars and bottles into radiant, sales-winning containers for your products.





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MAX FACTOR-1

The masculine approach is emphasized in the new gift package presently being introduced by Max Factor for its "Signature" line of after shave lotion and cologne for men. Contemporary styling is built into the flask-shaped bottles which are topped with massive gold-metallized plastic closures. Embossed foil labels and gold and black folding carton result in a luxurious package. Each bottle carries a neck tag and a 23K "Goldmark" gold foil for personalizing the container.

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PRINCE MATCHABELLI-2

Prince Matchabelli's Spring Fancy line of related fragrance items is newly re-packaged for Spring 1959. A turn-of-the-century buggy garlanded with bursting blossoms decorates the shiny white box that is bordered with delicate black grillwork. From the lower left, clockwise: Cologne; Cologne Spray Mist, in a lemon-yellow plastic-coated aerosol bottle; Dusting Powder, with a Spring-green puff; and Perfume Creme Sachet.

BOURJOIS-3

Plans for the annual Evening in Paris Deodorant Promotion have been announced by Bourjois, Inc. This year, in addition to the return of its popular Deodorant Stick Duo Promotion, Bourjois will put on sale for a limited time, its Evening in Paris "Roll-R" Lotion Deodorant Duo. The deodorants, packed two of a kind to an individual boot, will be available at the special sale price of \$1.00 instead of their \$1.50 value.

MARY CHESS-4

Mary Chess is presenting an aerosol packaged perfume for the first time, as half of the newly matched "Spray Mates" fragrance set. The purse-size dispenser, which has a polished brass outer case, stainless steel inner cartridge, and metered valve, holds 1.87 fluid drams of fragrance.







The matching aerosol for cologne holds eight fluid drams. Available in Tapestry, White Lilac, Strategy and Yram fragrances.

CHERAMY-5

Cheramy has added chloracel, a new aluminum compound, to its April Showers stick deodorant, making the preparation an antiperspirant as well. According to the firm, tests prove it will not irritate the skin nor harm fabrics. The consistency of this stick is such that it will not crumble under pressure of the fingers. The price is still 59¢ plus tax.

JOHNSON & JOHNSON-6

New Johnson's Baby Liquid Cream combines the soothing properties of a lotion with the protection of a cream. The pink easy-flowing cream is formulated to help prevent diaper rash and other skin irritations, while leaving a fresh, clean scent. Packaged in an unbreakable 4-ounce squeeze bottle, it costs 60 cents.

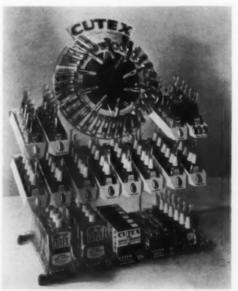
LANOLIN PLUS-7

Lanolin Plus offers a new dual special of two newly developed shampoos, Lanolin Plus Shampoo plus Egg and Lanolin Plus Liquid Castile Shampoo. The Castile Shampoo is a clear, mild soap shampoo. Shampoo plus Egg contains two per cent fresh, whole egg giving it a creamy texture. Both shampoos contain a special hair-conditioning agent. The 16 oz. family size bottles retail at a special price of 99¢.

NORTHAM WARREN-8

This new Cutex counter display is made up of high-impact styrene with metal supports seated in plastic composition counter protectors. The top center of the display features a pilfer-proof Wheel of Fortune. The wheel moves freely in either direction, but permits access at only two points for the sales clerk to remove lipsticks. In the center of the wheel is a mirror that reflects the lipstick dummies. Beneath the wheel are twelve nail polish trays. The five trays at the bottom of the display are designed to accommodate other manicure items.











Chemical Engineering



Chemical Research



Quality Control

THE IMPORTANT INGREDIENT

The success of your perfume is the result of the abilities of the many creative, technical and service people, who have a part in the creation and production of the perfume itself.

VAH Persume Evaluation Board ... Unmatched in their ability, these professionals screen every-perfume sample on the basis of its intrinsic beauty as a fragrance, its adaptability. to a specific market, its potential level of consumer acceptance, its relationship to both competitive and companion items. Not the opinion of an amateur panel, but the recommendation of this experienced board of experts goes with every perfume sample submitted by VAH.

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BOTTLE FILLERS
for the Perfumer



model EBW PORTABLE FILTER—This filter is recommended for small capacity requirements. Accomodates from 4 to 8 124" dia. filter disks. Easy to set-up and operate.



Will rapidly fill small or batch lots of material at lowest cost. Fills bottles to uniform height without loss of material. Interchangeable spouts for filling shaker-type bottles to gallons.



Ertel Asbestos Filter Sheets for ultra polished brilliance are used for many fine perfumes and cosmetics. Available in 10 grades to fit all standard filters. Write regarding samples for superior result tests in your filter.

Write for Illustrated Catalog



POTLIGHT

The varying lengths of time company records must be kept in regard to income and excise taxes, social security, pay rolls etc. have been tabulated in a new report by Controllership Foundation Inc., 2 Park Ave., New York 16, N. Y. The 242-page study comprises Volume 1 of a series entitled "Corporate Records Retention." It also lists federal retention requirements affecting companies in the 15 major industries. The report indicates in which cases and under what conditions microfilms may be retained in lieu of the original records. Copies are available from the Foundation at \$10.

The Business Outlook for Chemicals and Pharmaceuticals in 1959 was the theme of the mid-Winter meeting of the Drug, Chemical and Allied Trades Section of the New York Board of Trade at the Waldorf-Astoria hotel, New York City, January 29. Norman C. Babcock, vice president of Union Carbide Olefins Co. was moderator. The speaker for the chemical industry was O. V. Tracy, vice president, Esso Standard Oil Co. and for the pharmaceutical industry, John T. Connor, president of Merck & Co.

Reduced prices of oil orange sweet U. S. P. California coldpressed and oil orange sweet California distilled, Exchange brand, have been announced by Fritzsche Brothers Inc. and other distributors. The former is now \$1.50 per lb. in 35 lb cans or 385 lb. drums; and the latter at 70¢ per lb. in 35 lb. cans or 385 lb. drums. Six months contracts are available for both oils.

Charles of the Ritz hair styles were demonstrated at the Fifth Avenue Assn. dinner party and luncheon at the Waldorf-Astoria hotel, New York City. January 21 and 22. The hair of many of the models at the presentation of the Spring and Summer fashions was styled by leading American designers. Oriental hair fashions predominated.

The 27th annual dinner of the BIMS held in the St. Regis hotel. February 4, proved to be a gala affair. In addition to the banquet a splendid program of entertainment was provided. The success of the affair was due largely to the work of the Dinner Committee composed of Gene Moore, chairman; Leonard Schultes. Robert Miller, Donald Leinbach, Walter Nuckols, Philip Heinle and Harry Griffiths.

A new magazine for teenagers, for girls between 13 and 19 years of age, is to be published by the Dell Publishing Co., 750 Third Ave.. New York 17, N. Y. and will make its appearance April 2. It is to be called Ingenue and is to be edited by Alice Thompson.

Otto of Rose from Asia Minor, produced by Gulculer Istihsal ve Satis Kooperatifi, Isparta, Turkey (Rose Producing and Sales Cooperative) is now available in the United States through its representative Cemil Erk, 180 Central Park South, New York 19, N. Y. The oil is available in light and cabbage color and is reported to be produced in a plant with the most modern equipment by European experts. Rose concrete is also available.

Coutin Associates, of which Pierre Coutin, former president of the Essential Oil Assn. of the U. S. A. was president, has moved its offices and laboratories to 118 East 28th St., New York 16, N. Y. The telephone number is MUrray Hill 3-9057.

The Annual Symposium of the American Society of Perfumers will be held April 20 at 2 p. m. in the Essex House, New York City. The program for the meeting will be published in the following issue.

Pharma Craft Corp., subsidiary of Joseph E. Seagram & Son, has been reorganized. Frank P. Bell, president has resigned and Ralph C. Robertson also has resigned to become director of advertising for B. T. Babbitt Inc. Dr. Edward Sheckman, medical director of Seagram has been named general manager of Pharma-Craft in complete charge of all of its activities. The company makes Fresh deodorant and other cosmetics.

Five new flavors to its line of Park's sugarless chewing gums—cinnamon, clove, grape, licorice and berry have been added by Chiclecraft, Inc., Knoxville, Tenn.

Amphoteric surfactants are now being made and sold by General Mills, Minneapolis, Minn. The new line of surfactant products bears the trademark "Deriphats". They are described as salts of N-alkyl beta-aminopropinates possessing both cationic and anionic functionality. The new surfactants have applications in cosmetics, shampoos, household cleaners, corrosion inhibitors and emulsifiers.

To keep their women employes who normally work on assembly lines employed during the six weeks required to move its headquarters the Barbasol Co. Indianapolis, Ind. sent them to drug stores, supermarkets and barber shops as ambassadors of good will on behalf of Barbasol Presto lather shave cream. The public relations job accomplished by the women proved to be profitable and the company won the good will of the employes to a high degree for giving them interesting work to do with pay rather than laying them off.

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A QUESTION...

AN ANSWER...

AND PROOF!

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OUR attention is called to this attractively priced specialty for a particular reason: It demonstrates how the focusing of such resources as the accumulated skills, experience and specialized laboratory and manufacturing facilities of our firm upon a predetermined objective often results in astonishing economies for our customers. Ylang Ylang is an important oil used in the perfuming of soaps, toiletries and cosmetics. Top quality Ylang Ylang Extra has been quoted recently at \$38.00 per lb.; First Quality Ylang at \$24.00; Second Quality at \$12.15. Our YLANG YLANG PURE NO. 123-a product of long-studied research . . . a correct, scientifically balanced mixture of absolutely pure ylang ylang fractions—is offered at the remarkably low price of \$8.75 lb. Odorwise, qualitywise and pricewise, it offers outstanding advantages to all those who require a pure, natural ylang in their fragrance formulations. Convincing proof of these advantages can be demonstrated by comparing YLANG YLANG PURE NO. 123 with its much costlier "Extra" grade and First and Second Quality oils. Examine this oil and see what a well conceived concentration of effort by Fritzsche specialists has accomplished for its customers.



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This acetylated version of our product has a higher ester value—a complete, fully rounded and, therefore, smoother odor. Write for samples if you're interested.

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News

and Events

Dr. Oliver L. Marton President of American Perfumers

Dr. Oliver L. Marton, chief perfumer for Shulton Inc. and well known throughout the industry both here and abroad for his lectures before scientific societies was



Dr. Oliver L. Marton

elected president of the American Society of Perfumers at its January 21 meeting in New York City.

Other officers elected were: Bernard Polak, vice president; and John Hancock, director. The remaining officers continue as their terms have not expired. The complete slate of officers for 1959 is as follows: Chairman, Jacques Masson, Flamhaft Laboratories; President, Dr. Oliver L. Marton, Shulton Inc.; Vice President, Bernard Polak, Polaks Frutal Works; Secretary, Harry C. Saunders, Givaudan Corp.; Treasurer, Edwin D. Morgan Jr., Lever Bros. Co.; and directors—Dr. Herbert Sommer, Prince Matchabelli Inc.; Dr. Walter Lengsfelder, Fleuroma Inc.; Elmer L. V. Sulik, van Ameringen-Haebler Inc. and John Hancock, Warner-Hudnut div. of Warner Lambert Pharmaceutical Co.

Soap Assn. Considers Myriad Subjects at Record Meeting

On our way to the planets we will still be washing out our socks. Both ventures fell within the range of interest explored at the 32nd annual convention of the Association of American Soap & Glycerine Producers at the Waldorf-Astoria hotel, New York City, January 20, 21 and 22. About 500 executives from the soap and detergent industry and from allied fields such as fatty chemicals and glycerine attended the meeting.

Gen. Lucius Clay, chairman of the

board of the Continental Can Co. reviewed the international situation. John Dille, military editor of Life discussed the "Race for Space." About 30 other speakers focussed their attention on industry problems under the general theme of "A two-way view of all that's new."

The first general session concentrated on outside influences affecting soap usage: new fabrics, new washers, new home design trends. The importance of better sanitation in industrial plants was also covered.

The second general session dealt with improvements in the industry's own products and packages. There was also a discussion panel on new ingredients for soap products to make it easier to keep things clean.

Special sessions were devoted to fatty acids and glycerine. A panel of experts discussed alkyd resins.

President Andrew K. Forthmann opened the convention with a brief address and it was closed with the annual banquet and floor show.

Procter & Gamble Elects New Officers

Procter & Gamble's Board of Directors recently elected three executives to new positions in the company.

J. M. Ewell, formerly vice presidentmanufacturing, was named vice president-Manufacturing and Employee Relations; C. K. McCracken, formerly vice president and comptroller, was named vice president-Corporate Affairs; D. P. Fite, formerly associate comptroller, was elected Comptroller of the company.

Felton Adds Four to Twenty-Five Year Club

The Felton Chemical Co., Inc., at their annual Christmas party, welcomed four more employees into their growing 25-year club. The new additions are: Ed Barbeau, Stanley Maas, George Grubel and Bill Zeckerman. The Felton Chemical Co. celebrates its 36th anniversary this month.

Germaine Monteil Address Correction

In announcing the new address of Germaine Monteil in the last issue, the street number was inadvertently listed as 750 Fifth Avenue. The correct address is 730 Fifth Avenue, New York 19, N. Y.

Governor Meyner Dedicates New Kohnstamm Flavoring Plant

Governor Robert Meyner, of New Jersey, was the featured speaker at the dedication ceremonies for the new H. Kohnstamm & Co. flavoring plant in Kearny, N.J. In his address, he stressed the importance of the international aspects of the food flavoring industry towards maintaining a healthier world atmosphere. The new plant covers an area of 40,00 square feet and is designed to provide a continuous flow of production from the entrance of raw materials to the shipment of finished flavoring products. The dedication ceremonies were attended by over two hundred and fifty Kohnstamm employees, friends and guests. Mayor Joseph M. Healey of Kearny, a featured speaker, told of the cooperative spirit existing between the Kohnstamm organization and the officials and residents of his city.

Erik Vles Marks 40th Year With Polak's Frutal Works

Erik Vles, treasurer and sales manager of Polak's Frutal Works, Inc., Middletown, New York, was honored recently on the completion of his 40th year with the company. The anniversary was celebrated at a dinner given for Mr. Vles at the Orange County Golf Club during the company's annual sales meeting. The firm presented him with a custom-made Hi-Fi Radio-Phonograph set.



Erik Vies

Mr. Vles began his career with Polak's Frutal Works in Amersfoort, Holland, in 1918 as a salesman. In the first ten years he traveled extensively on the continent. In 1928 he was transferred to New York. The company has been located in Middletown, New York since 1950. Mr. Vles will continue to occupy himself primarily with management of sales in North America.

NBBMA Will Hold Breakfast Meeting

The Board of Directors of the National Beauty and Barber Manufacturers Assn. will hold a breakfast meeting in the Hotel Statler-Hilton, New York City, during the International Beauty Show on March 18. The NBBMA Board will make final plans for the Assn's deluxe convention at The Concord, Kiamesha Lake, N. Y., May 21-24, 1959, the theme of which is . . . "The Manufacturer Plans the Future."

NEW YORK S.C.C. ELECTS NEW OFFICERS





Theodore Ostrowski

New York Cosmetic Chemists Elect Officers

The New York Chapter of the Society of Cosmetic Chemists recently installed Theodore Ostrowski, left photo, as chairman at its year-end meeting. Mr. Ostrowski, chief chemist at the Monteil Manufacturing Co., is a charter member of the N.Y. Chapter, having served as its Treasurer in 1955, 1956 and 1957. In the above photo, outgoing President James Baker with some of the new officers Secretary, Saul Bell; Chairman-Elect, John Longfellow; Treasurer, Martin Katz.

SPONSOR, PRODUCER, STAR ON PRODUCTION LINE



Escorted by George L. Schultz, president of Shulton, Miss Donna Reed offers a bottle of Old Spice to Tony Owen, her husband and producer of The Donna Reed Show, sponsored by Shulton. She and Mr. Owen spent a morning at the Shulton plant. Autographs along the assembly line were part of this good-will tour. Future promotional plans to be tied in with Miss Reed's availability for appearances at sales meetings, etc. were discussed.

New Officers for 1959 Elected by CIBS at Recent Meeting

The Cosmetic Industry Buyers & Suppliers Assn. has elected the following officers for 1959: President, John Duncan, Hazel Atlas Glass Co.; Vice Presidents, Lamson Scovil, Scovil Manufacturing Co. and Robert C. Ring, Hewitt Soap Co.; Recording Secretary, Ray Rogers, Colgate-Palmotive Co.; Corresponding Secretary, Allen T. Stewart, Parfait Promotional Packaging Co.; Treasurer, Jay Stephens, Daggett & Ramsdell Inc. Directors elected were: Edward Ellis, Charabot & Co.; Walter S. Nuckols, Carr-Lowery Glass Co., and William Jaeger, Park & Tilford. Shockley C. Gamage, Magnus, Mabee & Reynard, Inc., program chairman; John Seidler, Whittaker, Clark & Daniels, Inc., publicity chairman and Eugene Roberts Lanvin-Parfums, auditing chairman.

Ruth Kitchen Retires as D & O Advertising Manager

Mrs. Ruth Kitchen, advertising manager for Dodge & Olcott Inc. retired but will continue as editor of the D & O News.

Fritzsche's Martin V. Cusack Joins Quarter-Century Club

A luncheon celebration honoring Martin V. Cusack, first 1959 member to join the growing ranks of Fritzsche Brothers' Quarter-of-a-Century Club was held January 12. Mr. Cusack heads the Receiving Department of the well known essential oil and chemical firm. In addition to the usual illuminated scroll commemorating such achievement, Mr. Cusack was presented with a Government bond by the firm's officers and directors, and a gold wristwatch by his fellow employees.

British S.C.C. Plans Congress of Cosmetic Science

The Society of Cosmetic Chemists of Great Britain is accepting applications for tickets to the British Congress of Cosmetic Science, to be held April 15 thru 17 in London. Interested parties should contact Dr. R. H. Marriott, c/o County Laboratories, Ltd., Honeypot Lane, Stanmore, Middlesex, England. The program, in four sessions, will include: Analysis of Raw Materials; Assessment of Finished Products; Manufacturing or Processing; and Biological Assessment.

OBITUARY

RAY HAMILTON

Ray Hamilton, mid-west representative for Christian Dior Perfums Corp. died of a heart attack in Cleveland on January 18, at the age of 53. Services were held at Strang's Funeral Home in Antioch, Illinois on January 20. Mr. Hamilton had been with Christian Dior Perfumes for the past six years. Prior to that he was associated with Parfums Schiaparelli Inc., and saw active service in World War II as a pilot. Mr. Hamilton leaves a widow and young daughter and many good friends in the industry.

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HELENA RUBINSTEIN AWARDS ANNUAL GRANT



Medical missionary work of the Maryknoll Sisters is detailed for Madame Helena Rubinstein by Sister Mary Eunice, left, and Sister Agnus Therese M.D. Madame Rubinstein presented a \$1,000 annual grant to the Maryknoll Sisters on behalf of the Helena Rubinstein Foundation.

NOTABLES AT CHRISTIAN DIOR SALES MEETING



The salesmen standing in the picture from left to right are: Ray Hamilton, mid-West; Don Cowling, Pacific Coast; Bill Dixon, Southeast; Ken Morgan, Northeast; and Fred Farnell, Metropolitan New York. Seated from left to right are: Germaine Ballou, assistant to the general manager; Paul Bremer, general manager, Bernard Picot, executive vice-president of Parfums Christian Dior Paris; and Alice Meltsner of Jill Jessee, Inc.

Rubinstein Foundation Awards Grant to Maryknoll Sisters

The Maryknoll Sisters have been named recipients of a \$1,000 annual grant from the Helena Rubinstein Foundation in recognition of their wide-spread work of charity, commended by the Foundation as "interracial, intercultural and international." Madame Helena Rubinstein made the first award on behalf of the Foundation. Accepting for the Maryknoll Sisters, a Roman Catholic Order of missionary nuns with head-quarters at Maryknoll, N. Y., were Sister Mary Eunice, one of the order's four Councilors General, and Sister Agnus Therese, M.D., a missionary doctor recently returned from the Maryknoll Clinic in Pusan, Korea.

Dr. Lehman Discusses Drugs in Cosmetics Before S. C. C.

Dr. Arnold J. Lehman, director of the Division of Pharmacology of the Food & Drug Administration was the chief speaker at the February 4 meeting of the New York Chapter of the Society of Cosmetic Chemists. His topic was "Drugs in Cosmetics—Should they Mix?" It is the feeling of the Food & Drug Administration that potent drugs do not belong in cosmetics. Dr. Lehman discussed the reasons for this and cited examples to emphasize the hazards of widespread use of drugs in cosmetics.

Toilet Goods Assn. Standard For Methylphenyl Silicone

The Board of Standards of the Toilet Goods Assn., Inc., has issued a standard for Methylphenyl Silicone.

Christian Dior Perfumes Corp. Holds Sales Meeting in New York

Christian Dior Perfumes Corp. held a three-day sales meeting at the Hotel Gotham in New York City early in January. The formal business sessions were followed by a dinner at the Copacabana. Bernard Picot, executive vice president of Parfums Christian Dior Paris, timed his several weeks' visit to the United States to include the sales meeting which was conducted by Paul Bremer, general manager. Plans for 1959 were discussed including new items, promotions, advertising, etc.

EMULSIFIERS

HYDROLAN hydrogenated Lanolin self emulsifying

LANIDROL Water soluble, hydrogenated lanolin

EMULSIFIER "B.B.C." Perfect emulsifier for brilliantines

EMULSIFIER "W.A.F." For emulsifying permanent-wave

LIPOCERINA Oil soluble hydrogenated lanolin

ESPERIS s.a. via Ambregio Binda, 29 Milano, Italy Cable: Fayawd-Milano AMERICAN LANOLIN CORP.

13 Railroad Street Lawrence, Mass.

U. S. Representative



New Officers of Soap & Glycerine Producers

Officers for 1959 elected by the Assn. of American Soap & Glycerine Producers Inc. are: A. K. Forthmann, Los Angeles Soap Co., president; W. H. Burkhart, Lever Bros. Co., vice president for the East; A. W. Schubert, Emery Industries Inc., vice president for the Middle West; A. C. Pelletier, Purex Corp., vice president for the West; N. S. Dahl, John T. Stanley Co., treasurer; M. A. McManus, Lever Bros. Co., assistant treasurer; and Roy W. Peet, secretary.

Stanton Sales Co. Now Incorporated

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d a otel anvere ana. dent med ited hich eral ssed verThe Stanton Sales Co., 237 First Ave., New York, 3, N. Y. founded and operated as a partnership between Michael A. Stanton and Mrs. Bettie Stanton has been incorporated with Mr. Stanton as president and Mrs. Stanton as secretary-treasurer. The company will continue to operate as in the past supplying thioglycolates, thiocyanates and other materials for the industry.

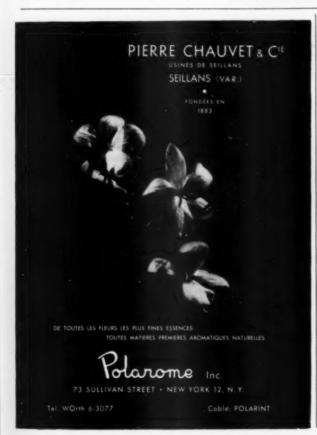
News of Grasse Second Issue Available

Nouvelles de Grasse, second issue, published by Charabot & Cie, is a valuable bulletin concerning the production of essential oils in that area. The major portion of the bulletin is in English as well as French.

Founder of S. C. C. New York Chapter Honored



Michael Stanton receives the plaque awarded to him by the Chapter from President Harry Isacoff





R. D. WEBB & CO. HOLDS ANNUAL SALES MEETING



R. D. Webb & Co., Inc., manufacturers of food flavors and essential oils, held its annual sales meeting from December 15-December 18 at the executive offices in Cos Cob, Conn.

Shown in above photograph, reading from left to right, are: bottom row—Benjamin Jarvis, vice president in charge of sales and Richard D. Webb, president; second row—William H. Peacock, middle atlantic sales representative, Harlan Wolfe and George A. Hart, midwestern sales representatives, Albert O. Daniels, New York sales representative, and Wallace G. Brindise, midwest district sales manager; third row—John Orphan, west coast sales representative, Robert G. Haefner, vice president in charge of purchasing and John Ehresmann, west coast district sales manager.

Mrs. William G. Mennen Sr. Died January 27

Mrs. William G. Mennen Sr., wife of the president of the Mennen Co., Morris Township, N. J. died January 27. She is survived by her husband and five children including vice presidents William G. Mennen Jr. and George Mennen of the Mennen Co. Mrs. Mennen was 69 years of age.

Dr. Irwin I. Lubowe Awarded U. S. Patent

U.S. Patent #2,865,589 has been awarded Dr. Irwin I. Lubowe, New York City physician and chemist. The patent covers a novel process for solubilizing mineral, vegetable and animal oils in low molecular weight alcohols by the use of esters of fatty acids. Before this invention, it was impossible to secure a stable, clear solution of an oil in alcohol. The patent discloses the use of isoproply, ethyl, methyl and butyl esters of fatty acids, saturated and unsaturated. The fatty acid esters most frequently used are isopropyl palmitate, methyl myristate and linoleate, ethyl palmitate and ethyl myristate. The patent also suggests the use of this process for postoperative and geriatric feeding containing large amounts of nutritive vegetable oils and ethanol.

McKesson & Robbins Builds New Plant in Denver

Tad M. White, district vice president of McKesson & Robbins, Inc. recently announced the expansion of the company's wholesale drug operations in the Denver area with the addition of a new building in the Mile High development area of Denver. The new building, constructed of blood red brick framed with strawberry cream brick, will bring McKesson's square foot occupancy in Denver to approximately 85,000 square feet. Edward F. Polanis will direct the company's activities as division manager of the new building.



Successor

Successor to W. J. Bush & Co., Inc.

R. D. WEBB & CO., INC.

Distillers of essential oils of outstanding quality. Exclusive American agents for genuine

MYSORE SANDALWOOD OIL



R. D. WEBB & CO., INC. Main Office: Cos Cob, Conn. Branches: Chicago and Los Angeles

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Mumford President and Chief Executive of Lever Bros. Co.

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Milton C. Mumford has been elected president and chief executive officer of the Lever Bros. Co., New York City. He was formerly executive vice president and replaces William Burkhart, chairman of the board who previously was president as well as chairman of the board.

Alpine Aromatics Enlarges Sales Coverage

Benjamin S. Young and F. R. Carroll have been appointed sales representatives for Alpine Aromatics, Inc. according to a recent announcement by Raoul Pantaleoni, president. Mr. Young was formerly



Benjamin S. Young

associated with Camilli, Albert & Laloue, Inc. and more recently with American Aromatics. In his new position Mr. Young will be responsible for the firm's sales of fine perfume specialities and compounds. Mr. Carroll was formerly with Rheem Manufacturing Co. and will be primarily responsible for sales of industrial and non-cosmetic adorants.



Dr. Irving Levenstein and Mr. Arthur J. Cehane of Leberco Laboratories, Roselle Park, New Jersey are shown breaking ground for a new addition to their pharmacological laboratory.

CHESEBROUGH-POND'S EXECS AT MATCHABELLI SALES MEETING



Chesebrough-Pond's executives attend December Prince Matchabelli Sales Meeting at the West-chester Country Club: (from Left) Albert B. Richardson, vice president, Chesebrough-Pond's Inc.; Clarke C. Hambley, vice president, Prince Matchabelli Inc.; A. A. Lynn, vice president, Chesebrough-Pond's Inc.; Owen Stoner, president, Prince Matchabelli Inc.; Jerome A. Straka, president, Chesebrough-Pond's Inc.; Paul P. Woolard, vice president, Prince Matchabelli Inc.; William C. Watson, vice president, Chesebrough-Pond's Inc. Prince Matchabelli Inc. was acquired by Chesebrough-Pond's Inc., October 1, 1958.

Salesmen's Assn. Elects New Officers

James E. Spencer of the Harshaw Chemical Co., was elected and inducted into office as president of the Salesmen's Assn. of the American Chemical Industry, Inc., at the Annual Induction Luncheon held at the Hotel Commodore in New York, January 20. Other officers elected for 1959 are: Vice President, George W. Poland, Jr.; Treasurer, Preston F. Tinsley; Secretary, Stewart Cowell. In addition, the following were elected as replacements on the Board of Directors: James M. Fergusson, John M. Glaze, Paul E. McCoy, Frank Reynolds, William Wishnick, Walter H. Farley.

Huisking & Co. Announces Merger Of Affiliated Corporations

Glyco Chemicals, Clintbrook Chemical Co. and Peder Devold Oil Co. have been made operating divisions of Chas. L. Huisking & Co., Inc. in a merger of affiliated corporations, including its investment corporation. William W. Huisking, who was elected president in the first step in the realignment of the executive personnel, announced the appointment of Chas. L. Huisking as chairman of the board, and Dr. Eugene McCauliff as vice president.

SEMI-ANNUAL EDITORIAL INDEX NOW AVAILABLE

The semi-annual editorial index of AMERICAN PERFUMER AND AROMATICS for the period from July 1 through December, 1958 is now available. Copies can be obtained without charge by writing to:

AMERICAN PERFUMER AND AROMATICS 48 West 38th Street New York 18, N. Y.

120 YEARS SERVICE WITH H. KOHNSTAMM



Shown here are three veterans of H. Kohnstamm and Co., as they received special awards for forty years of individual service with the company. Making the presentation is Paul L. Kohnstamm, president. This ceremony was a highlight of the program dedicating the opening of the new Kohnstamm plant in Kearney, New Jersey. Left to right are: Paul Tamalis, Walter Brown and William Klenk.



Officers for 1959: left to right: Pierre Coutin, executive committee; Frank F. Dittrich, secretary-treasurer; Gert Keller, president; Ray C. Schlotterer, managing director; and members of the executive committee—Bernard Polak, Edward Manheimer and Robert E. Horsey. John Cassullo, vice president and George Mann, member of executive committee not shown.

Trade Trends and Specifications Considered by Essential Oil Assn.



J. W. Veit, L. M. Allstadt, F. G. Buehler, Frederick Lueders, Edward Morrish, George Waeglin, J. R. Dominica and Ross Daggett

Ten new essential oils and ten new aromatic chemical specifications for use in the flavor and fragrance industries now ready for inclusion in E. O. A. Book of Standards



Irving Bennett, Dr. Victor Fourman, Jeseph Baird Magnus, E. R. Durrer and William Lakritz

Gert Keller, president of Schimmel & Co. was reelected president of the Essential Oil Assn. of the U.S.A. at its annual meeting in New York City, January 9 in recognition of his splendid administration of the affairs of the association in 1958.

Other officers elected were: Vice President, John Cassullo, president of Fritzsche Brothers Inc.; Secretary-Treasurer, Frank F. Dittrich, treasurer of Ungerer & Co.; and members of the Executive Committee: Pierre J. Coutin, president of Coutin Associates; Robert E. Horsey, vice president, Givaudan-Delawanna Inc.; Edward Manheimer, vice president, J. Manheimer; George Mann, vice president, Norda Essential Oil & Chemical



Carl Wellenkamp, George McGlynn and A. D. Warren



Dr. Paul Muhlethaler, E. R. Durrer, Dr. Walter Lengsfelder and A. Fiore



Henry Eickmeyer, Clifford Jackson, Charles Swan and Charles Fricke



Waldo Reiss, Albert Dillinger, Fred Fielding and Howard Miller

Co. and Bernard Polak, Polaks Frutal Works.

In his presidential address Mr. Keller pointed out that the essential oil industry has experienced a growing tendency to merge and enlarge its individual company structure. A growing emphasis on the sale of compounds and specialties was also observed and as a result the buying and selling of basic raw materials is becoming more concentrated in the hands of fewer companies.

The challenge facing the industry he said is the necessity of expanding the use of essential oil products not only by increasing sales to underwrite increasing overhead but basically to increase the consumption of essential oils both here and abroad. The turnover of the cosmetic industry estimated to be about one and a half billion dollars in 1959 offers a target and a challenge to the ingenuity of our perfume chemists.

The steadily increasing use of essential oils in flavors for the expanding food industry is another important factor. The recognition which American cosmetic and soft drink manufacturers have won abroad has resulted in many essential oil companies taking a new interest in foreign markets. As a result of the foregoing the American essential oil industry has registered impressive gains. Price-wise the past year was generally in the consumer's favor with quotations for the majority of items receding steadily.

With few exceptions the materials handled by essential oil dealers were in good supply—the exceptions were American oil of orange which was affected by the freeze in Florida where prices reached three times their normal value and geranium oil Bourbon where crop failure forced an increase in prices in the final months of the year. The third exception was oil vetivert Hati which experienced a revolution with resulting upward price adjustments.

During 1958 there were 31 membership and committee meetings. The membership now includes 60 active and 12 associate members,

Dr. A. Fiore reported for the Scientific Section. As a result of its work ten new essential oils and ten new aromatic chemical specifications for use in the fragrance and flavor industries are ready for inclusion in the E. O. A. book of standards.

E. Van Liew reported for the trade mark committee;B. Dennis for the import committee; and Felix Goudsmith for the export committee.

The work of the membership committee under George Cadgene and of the Scientific and legislative committees as well as other association activities were discussed by Mr. Keller.

Following the meeting a cocktail reception was enjoyed after which the annual banquet was held.

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GERSONALITIES

Fred J. Fitzgerald was appointed field sales manager of Yardley of London, effective January 1, according to a recent

Fred C. Theile has been appointed research administrator of Shulton, Inc., according to a recent announcement by Dudley F. Lum has relinquished the duties as manager of the Chicago Branch Office of Givaudan-Delawanna, Inc. and



Fred J. Fitzgerald

announcement by John F. Bales, vice president in charge of sales. Mr. Fitzgerald, with Yardley 22 years, was manager of the New England territory prior to his appointment to the executive staff four years ago. His headquarters will be in New York City.

Milton D. Faber, president and general manager of the Stineway-Ford Hopkins Drug Store chain resigned recently from all positions with the firm.

Lester D. Berger, Jr. has been appointed assistant manager of the New Chemicals group of Union Carbide Chemicals Co., division of Union Carbide Corp. In his new position, Mr. Berger will be responsible for the major development areas of water-soluble chemicals and surface-active agents.



Dr. David Jorysch

Dr. David Jorysch, assistant vice president and technical director of the flavor division of H. Kohnstamm & Co., was elected to the board of directors at a stockholders meeting held recently.



Fred C. Theile

George L. Schultz, president. Mr. Theile will coordinate the activities of the organic research laboratory, control and analytical laboratories, perfume laboratory, consumer research department, and the library. Mr. Theile, who joined Shulton in 1951, was formerly production manager of Shulton's Fine Chemicals Division, and perfume administrator.

Fred C. Hitchcock Jr., has been appointed assistant to the president of Shulton, Inc., according to a report by George L. Shultz, president of the company. Mr. Hitchcock's primary responsibility will be to assist Mr. Schultz and



Fred C. Hitchcock, Jr.

the company's division managers in evaluating present and developing new marketing methods. Prior to joining Shulton, Mr. Hitchcock was director of New Products for Warner-Lambert Pharmaceutical Co.

Paul Skillman has been appointed drug chains merchandising manager for The Toni Co., succeeding Clark J. Gutman.



Dudley F. Lum

its associate companies, Givaudan Flavors, Inc. and Sindar Corp. Robert L. Williams, who has been associated with Givaudan since 1948, has been appointed to assume the duties of manager of the Chicago Branch Office. Mr. Lum, who has been manager of the Chicago office since 1927, is a well known figure in that area, and he will continue to personally serve his old customers in the territory. He has been associated with the sale of Givaudan products and with the industry for over fifty years, a record few members of the industry can equal.

Kenneth B. Arrington has been appointed general product manager of the Toilet Articles Division of the Colgate-Palmolive Co. He will be responsible for the supervision of all Product Managers



Kenneth B. Arrington

in the development of advertising and merchandising for the Division's products. Mr. Arrington joined the company in 1951 as assistant advertising manager and during 1952 took over the company's important Colgate Dental Cream. David Brittain has been appointed manager of merchandising of Yardley of London. He was former product manager for the firm. Mr. Brittain, with Yardley 12 years, will supervise the advertising production and product development departments as well as the art studio.

Dr. Richard K. Lehne has been appointed to the post of Director of Research and Development of the Wildroot Co. He replaced Emanual Gundlach who announced his retirement from the Wildroot Co. a few weeks ago. Dr. Lehne will supervise research performed by his staff at Wildroot as well as other techni-

Eric Williams, newly appointed southern regional manager for Yardley of London, is the winner of the company's 1958 sales contest, according to a recent announcement. Mr. Williams, with Yardley for 29 years, was awarded the President's Cup and a cash prize for a record sales performance in Texas.



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Andre J. Mallegol

Andre J. Mallegol has joined the sales staff of Fleuroma Inc. He will increase the coverage of the metropolitan New York area, plus Pennsylvania.

Dr. Bernard L. Oser has been appointed a Lecturer on the faculty of Columbia University in the Institute of Nutrition Sciences in the School of Public Health and Administrative Medicine. Beginning with the Spring semester in February, he will give a course of lectures to graduate students on Food Regulation and Safety Evaluation. Dr. Oser is president and director of Food and Drug Research Laboratories, Inc.

George Greaves has been appointed regional manager in the north central states for Yardley of London. This area covers 11 states.

Robert M. Aude has been appointed vice president and general manager of the Heydon Chemical Division of Heydon Newport Chemical Corp.

R. Bruce Kideney, vice president in charge of manufacturing, and Emanuel Gundlach, director of technical research, of Wildroot Co., Inc., have retired.

John E. Logun has joined Dunbar Laboratories, Division of Chemway Corp., as research chemist, it has been announced by Dr. J. B. Nagler, Dunbar's director of product development.

Howard Blight has been named Drugs and Toiletries advertising manager at McCall's. Mr. Blight has been on McCall's sales staff since 1947, handling drugs, cosmetics, and other accounts.

Bernice Peck retired from "Mademoiselle" on January 15. Her many friends in the industry presented her with a government Bond and a scrapbook with individual messages.



Dr. Richard K. Lehne

cal research performed by consulting companies. Dr. Lehne started with Wildroot as a research chemist in 1952, after extensive experience in the chemical research field with General Aniline and Film Corp. and Spencer Kellogg and Sons, Inc. He received his B. S. degree Magna Cum Laude at Muhlenburg College and his Doctorate at Yale University.

P. Gerald Presson, formerly vice-president and general sales manager of Angelique & Co., has been appointed Aloe Creme's midwest regional sales manager, it was announced recently by Rodney M. Stockton, president of Aloe Creme Laboratories, Inc. He will make his head-quarters at the firm's midwest offices in Chicago.

Owen Stoner, now president of Prince Matchabelli, Inc., will return to the Vick Chemical Co. as a vice president on April 1, 1959. Mr. Stoner joined Prince Matchabelli, Inc., in 1948, and was its President when Vick sold the company to Chesebrough-Pond's on September 30, 1958. At that time, it was arranged that Mr. Stoner would continue as President during a six-month transition period.

John H. Breck, Sr., chairman of the board of John H. Breck, Inc., was recently honored by a testimonial dinner given by Union Carbide Chemicals Co. in Springfield, Mass. Mr. Breck was presented with a gold-plated, miniature tank car. Mr. J. A. Field, vice-president of Union Carbide Chemicals Co. stated that the miniature tank car symbolized the completion of 25 years of service by his firm to the Breck Co.

Charles R. Kircher, vice president and director of lipstick and related products research for Kolmar Laboratories has left for France, England and Germany where he will spend about six weeks visiting the Kolmar plants in those countries



A. T. DeVera, Jr.

A. T. "Gus" DeVera, Jr., of Morris Plains, N. J., has been appointed district sales manager for Fluid Chemical Co. of Newark, N. J. He will be responsible for development of new accounts for contract aerosol and liquid packaging.

Dr. Milton Harris, vice president and director of research of The Gillette Co., and founder of the Harris Research Laboratories, recently spent a month in Reading, England, seting up a new research laboratory for The Gillette Co.

Robert M. Bard has been appointed advertising manager of the International Division of Max Factor & Co. Mr. Bard had been associated with Max Factor & Co. for six years in its United States advertising department prior to his transfer.



Gustav Carsch

Gustav Carsch, an active member of the Society of Cosmetic Chemists, has been named vice president of Capulco, Inc.

John H. MacDonald was recently appointed plant superintendent for the Lyndhurst, N. J. plant of S. B. Penick and Co. He has been a member of the plant technical staff since he joined the company a year ago.

February, 1959

Trade Literature

A new 12-page Norelco booklet entitled "Questions and Answers on Electron Microscopes," is available from the Instruments Division, Philips Electronics, Inc. Compiled from actual queries asked in the field Norelco Microscope School sessions, the booklet discusses magnification, resolution, specimen preparation and fields of application. Shadow casting, electron diffraction, camera work, stereo techniques, astigmatism correction, lens details, beam wobbler, through-focus control, and many other technical matters are also covered.

"National Distillers and Chemical Corp. Expands in the Chemical Industry," is the title of a new brochure published by National Distillers to describe its chemical activities. Sections "How labeled We've Grown," "How We're Organized," "What Make," "Where We Produce," answer the question "Where We Proof where the company is now, along with how it got there. The highlight of the book is a "Plant-Tour" section, where each of the company's major plant and locations research shown in detail in a series of colored photographs.

The second annual addition of Bowker's Subject Guide to Books in Print is now generally available for the first time. The first

edition was published only for bookstores and libraries. This research aid uses 25,000 subjects as listed by the Library of Congress card catalog, and arranges 96,000 obtainable books under these headings. 30,000 cross references further reduce the time it takes to find information. 1480 pages, priced at \$20.00.

A technical information booklet concerning Macaloid has been issued by The Inerto Co. Macaloid, mineralogically known as hectorite, is available in a beneficiated form as Macaloid, or as unrefined Hectorite-200 Mesh. Sections of the booklet include: Rheological Patterns of Macaloid; Preparation of Macaloid Dispersions; Thixotropy in Relation to Concentration; Suspending Ability; Macaloid in Emulsions, etc.

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Continued from page 54

the degree of solubility and rate of absorption, together with an accelerated rate of discharge makes it, for certain products, an ideal propellant. It should fill a gap in this rapidly growing field of food stuffs, toothpaste, etc. On discharge there is some atmospheric expansion which can be aided by a mechanical break-up at the valve's final discharge orifice. Although some of it goes into the solution, it quickly frees itself in the atmosphere on discharge. The disadvantages of its lower degree of solubility, when compared with the other liquid propellants, are off-set by its many advantages, particularly for perishable foods. It should open new doors for the expansion of the whole field of pressurized packaging. Even as the industry has been stimulated by the nitrogen development, which has restricted application, due to its physical and chemical characteristics; so we hope that with this new transparent dry ice, application horizons will be further extended.

Propellant literature has appeared this last month or so and the 1958 edition of an Appendix to the Aerosol Technical series No. 3 is perhaps the highlight. This DuPont publication includes a summary of the United States Federal, State and Local Regulations and news affecting the Aerosol Industry. Two other items for the files-a list of the DuPont Aerosol literature and U.S. Patents of interest to the Aerosol Industry. It is pleasant (from my point of view) to mention publication from British suppliers. I.C.I. have issued a book on their "Arcton" refrigerants. This includes some man-sized graphs and a section on Aerosols. They have also issued a booklet " 'Arcton' for Aerosols' "

The last two journals of the Society of Cosmetic Chemists (American editions) both contained aerosol items. September volume has a comprehensive review of Aerosol Emulsion Systems by P. A. Sanders. "The various methods available for spraying water-based aerosol products are reviewed with emphasis upon the water-in-oil emulsion systems. By suitable choice of propellants and auxiliary solvents, nonfoaming sprays varying from very fine to very coarse may be obtained. The characteristics and properties of the emulsion systems, such as emulsion stability, flammability, viscosity, stability to electrolytes and alcohol, and particle size of the sprays are discussed. In the same volume, M.V. Wiener writes on Spray Pattern and says in conclusion, "The cosmetic chemist who intends to formulate a product in aerosol form should evaluate all the factors affecting spray or foam characteristics. Important factors are valve design, vapour pressure, thermodynamic values and the physical and chemical properties of propellant and product. Special emphasis should be given to the phenomenon of "flashing". Graphs were prepared to compare the relative flashing rate of halocarbons and hydrocarbons." The of halocarbons and hydrocarbons." The November issue of the Journal of the Society of Cosmetic Chemists contains an article by S. Prussin and H.R. Shep-herd entitled "Nitrogen and other inert gases as Propellants in Pressurized Packaging".

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MARKET OPTIMISTIC

While fewer price movements were noted in essential oils, aromatic chemicals, and other raw materials in the first month of the new year, many articles remained close or at the lowest levels in more than a year. It will probably take another few weeks or more before buying for the account of the toiletry, proprietary and other lines affected by the Easter

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holiday season gets underway, but sales for the account of the food and beverage trades have shown a moderate upturn following the year-end holiday season and a great deal of optimism prevails. More favorable reports from industry generally as well as gains in securities all tended to be reflected in a generally better tone in the raw materials market. decline. Prices dropped from \$1.20 to \$1.25 to \$1.10 to \$1.15 per pound. Unless some unforeseen development should take place such as the freezing weather that hit the citrus belt a year ago, Floridian oil may continue to decline nearer to the 35 to 50 cent level that prevailed before last years freeze.

OIL BOIS DE ROSE QUIET-

Trade in bois de rose was quiet following the activity noted in the final months of the year. Prices turned steadier following an extended downward trend that has featured this market for more than a year. A development of interest, however was the adoption of standard specifications on Peruvian oil by The Essential Oil Association of U.S.A.

SENSITIVE TONE IN CITRONELLA-

While Ceylon citronella weakened in price the overall position of the market appeared highly sensitive especially in the case of the Formosan variety which has been selling at the lowest price level in more than a year. Shipping prices out of Formosa fluctuated a little more frequently and at one time unconfirmed reports of a loss of several hundred drums served to have an immediate stiffening effect on prices.

SANDALWOOD IRREGULAR TO FIRM-

After dipping to \$13 per pound, oil sandalwood developed renewed strength in the face of small stocks and prospects of an early revival in demand following the slump in buying over the final month of last year. Quotations were moved up to \$13.50 to \$13.85 per pound. The chips from which the oil is made brought better prices at the last auction in the primary market.

VANILLA BEANS FIRM, HIGH-

Reports concerning the size of the new crop of Bourbon beans varied considerably. Direct reports from the primary center stated that the crop will total 350 tons while in this market, trade observers were of the opinion that it would amount to over 400 tons. However, the firmness in prices in Madagascar as well as the indifferent attitude on the part of producers as to whether they made sales or not tended to confirm reports that the new crop would only be 350 tons. Spot prices edged upward to the basis of \$11.25 to \$11.50 per pound.

TARTRATES UPSET-

Following an investigation, the Tariff Commission has recommended that the duties on tartaric acid and cream of tartar of 6 cents and 3.125 cents per pound, respectively, be doubled to 12 cents and 7½ cents per pound. It is still far too early to determine just what effect this will have on the market which has been featured by a marked shifting in sources of supply since October.

CELERY SEED LOWER-

Spot prices for oil celery were reduced 50 cents. Demand for the oil has been rather spotty. Some dealers grew more anxious to reduce their holdings on reports of some new production coming on the market.

TRENDS IN DETAIL

ADVANCES-	CURRENT	PREVIOUS
Vanilla beans—		
Bourbons	\$11.25	\$10.50
Mexicans	\$11.00	\$10.75
Oil vetiver, Bourbon	\$13.25	\$13.00
Coconut oil, tanks, coast	0.181/4	0.16%
Copra, coast, ton	\$245.00	\$230.00
Oil sandalwood	\$13.50	\$13.00
DECLINES-		
Oil orange—		
California, coldpressed	\$1.50	\$2.35
Californian, distilled	0.70	0.90
Floridian	\$1.10	\$1.20
Caffeine	\$2.10	\$2.50
Oil celery seed	\$13.00	\$13.50
Oil camphor, sassafrassy	0.35	0.38
Oil cananga, rectified	\$8.25	\$8.50
Gum styrax, Asiatic	\$4.25	\$4.50
Oil citronella—	4 1125	94.50
Formosan	0.52	0.60
Ceylon	0.60	0.65
Oil eucalyptus—		0.00
70-75%	0.60	0.63
80-85%	0.68	0.70
Oil petitgrain	\$2.30	\$2.40
Tallow, fancy	0.071/2	0.07%
Eugenol	\$1.70	\$1.75
(Above prices per pound unless otherwi	se specified.)	

GERANIUM OIL ACTIVE-

While the local market in geranium oil was generally quiet it is understood that some fairly good orders were placed for Bourbon oil for prompt shipment. Several thousand kilos were reported sold which in turn cut deeply into stocks in the primary center. Distillation of the winter crop had been delayed by dry weather, but the new receipts should prove sufficient to take care of anticipated future needs until the Spring crop gets underway.

CAFFEINE DECLINES-

A reduction of 40 cents per pound, the third major cut in the price of this material brought the price down to \$2.10, the lowest figure in twenty-five years.

Imports of caffeine have been running slightly below a million pounds. The item enjoys a good demand in the manufactore of soft drinks.

EXCHANGE BRAND ORANGE OIL CUT-

Sunkist Growers reduced prices on Exchange Brand California coldpressed orange oil by 85 cents per pound. Distilled oil was likewise reduced by 20 cents to the basic of 70 cents per pound. Its new price for coldpressed oil is \$1.50. Co-distributors of Exchange Brand orange oils include Ungerer & Co., Inc.; Fritzsche Bros., Inc.; and Dodge & Olcott. The reduction in Exchange Brand oils marks the first change since August 15, 1958 at which time coldpressed oil was lowered to \$2.35 from \$3.35 per pound. Floridian orange oil suffered a further

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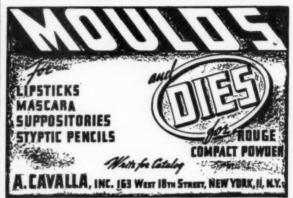
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